ZEALAND'S PERSONAL COMPUTER MAGAZINE

6ITS & BYTES

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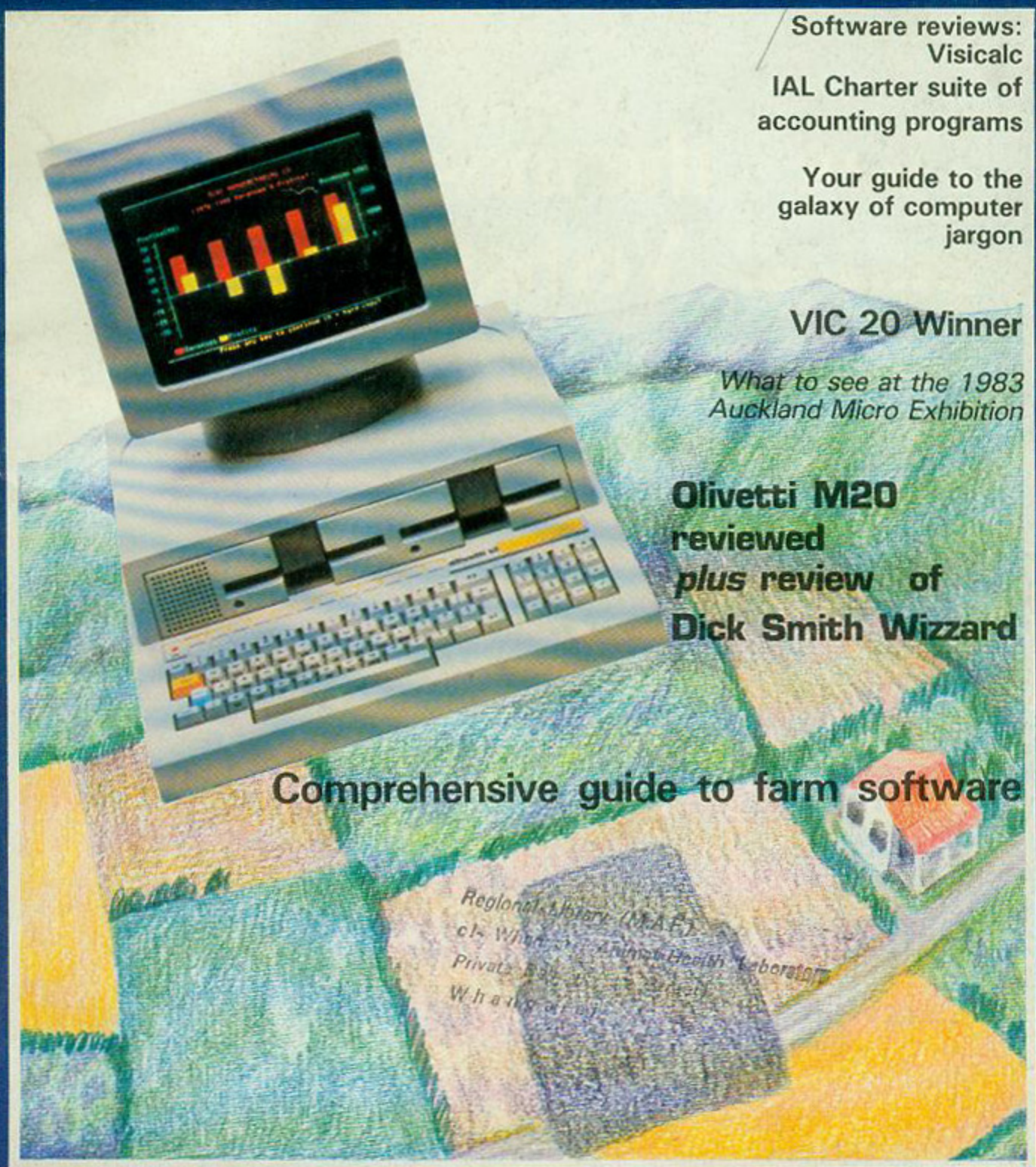

Software reviews:
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VIC 20 Winner

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Olivetti M20 reviewed *plus* review of Dick Smith Wizzard

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inside BITS & BYTES..

Issue No. 9, June 1983.

Coming up

Hardware Reviews
With so many new micros reaching New Zealand in recent months our reviewers are having trouble keeping up. But depending on the availability of machines we hope to have at least two reviews including the JR100 that has been held over for a couple of months.

Software Reviews
Supercalc — Peter Brown continues his look at financial modelling packages.
Solicitor Software — a guide to some of the legal software available.
New Microbee column.

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MICRO NEWS

A network consultancy service has been established in Dunedin by Rose Edwards.

Rose aims to sort out the best technical and cost effective method of making one device communicate to another for clients.

She has previously spent 11 years working for Post Office transmission and two years working on networks in private industry.

Network Consultancy Service can be contacted at P.O. Box 1473, Dunedin or by telephoning 771-852 Dunedin.

* * * *

A colour graphics terminal card to provide "high quality graphics and sound generation" for a number of different computers has been released by Brandt Electronics of Christchurch (P.O. Box 14-081).

The Brandt graph card provides an interface between the microcomputer and colour television receiver and is designed for TRS80, System 80, ZX81, Apple II, BBC, Commodore, S100 systems etc.

The card costs $499 retail and BITS & BYTES hopes to do a "test" soon.

★ ★ ★ ★

David Reid Electronics Ltd envisages the ZX spectrum being available through outlets and appointed dealers in the next month. With a more powerful operating system than the ZX81, the ZX Spectrum is available in 16KB and 48KB with full 8 colours, sound generator and graphics, and comes with all the necessary leads to connect to a cassette recorder and colour or black and white television.

Two future options for which no release date is available at this stage are: The ZX Microdrive, up to 100K bytes on a single interchangeable microfloppy, and an RS232/Network Interface Board for connecting printers, terminals and other computers to the ZX Spectrum. The 16K BASIC ROM includes serial drivers so that these devices can be simply plugged in and used.

Fifty per cent of the first shipment of MEC's Panasonic JR 100 were sold prior to their arrival in New Zealand in late May according to Mr Rob McNeil of MEC, Auckland.

These compact machines look like being popular with personal computerists and will be reviewed in a later issue (when we can get our hands on one).

★ ★ ★ ★

Following requests from many parents unfamiliar with computers and wishing to catch up on what their children are doing, perhaps dare we say a little envious of their childrens' camp experiences, Computer Camps Ltd, Auckland, has arranged its first camp for adults on June 2-3.

Executive director, Glyn Hurley says the course is designed to take the fear out of computing and give parents hands on experience in a happy relaxed environment.

★ ★ ★ ★

Two more courses on "Microcomputer Systems for Small Businesses" will be held at Christchurch Polytechnic this year.

The courses consist of four, four hour sessions over two weeks starting on August 1 and October 25.

For further information contact Mr Derham McAven, Christchurch Polytechnic, P.O. Box 22095, Christchurch.

★ ★ ★ ★

A British company claims to have developed the world's first "pirate proof" computer software packages.

Parwest says a numerical code system will protect its rental range of business and accounting software.

★ ★ ★ ★

Access Data has obtained the New Zealand agency for appropriately enough, the Access portable computer.

Special features of this 15

kilogram (33 pound) portable are its built-in 80cps printer and acoustic coupler.

Other standard features are Z80A processor, 64K RAM, 17.8cm (7 inch) screen, two floppy disk drives (180K capacity each), detachable keyboard, serial and parallel interfaces plus an 8 inch disk interface.

And in keeping with the portable tradition, the $5995 price tag includes the following software: CP/M, M BASIC, C BASIC, Communications, Fancy Font (20 different typefaces that the printer can use), Perfect Writer (word processor), Perfect Speller (electronic dictionary), Perfect Filer (small data base), and Perfect Calc (financial modeller).

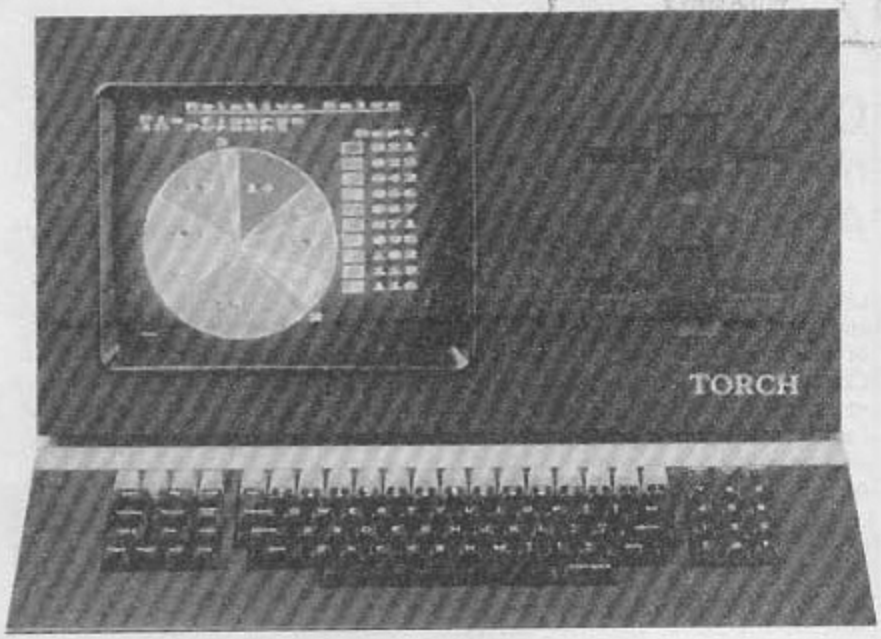
* * * *

AWA Data systems has released the MicroSpooler — a device that frees up the computer for other uses while a printer is in use.

Typically, a printer cannot produce hard copy as rapidly as the host computer can provide it. This means the user does not have access to the computer until the printer is finished. Print spoolers solve this problem by accepting data from the computer at a high rate of speed and storing that information until the printer is ready to accept it. This gives the user the ability to use the computer while the printer is working on another job.

So in effect, the MicroSpooler acts as another printer buffer. It comes in 16K, 32K and 64K versions with any combination of parallel and serial interfaces required.

The 16K parallel to parallel version costs $897 while the 16K serial to serial model costs $1097.



The Torch Computer

* * * *

BBC users don't despair. Twin disk drives and a Z80 processor for the BBC will soon be available in New Zealand in the form of the Torch Pack (see also BBC column).

The Torch Pack contains a Z80A processor, 16K ROM containing CPN, a CP/M compatible operating system, 64K RAM (giving a total of 96K) and two 5¼ inch floppy disk drives with a capacity of 400K each.

Thus the Torch Pack, which sits underneath the BBC and plugs in via the Tube port, will give BBC users access to a large range of software and provide the storage capacity lacking at present.

The Torch Pack will cost around $3000, says the New Zealand agent, Computer Point Ltd, of Christchurch (P.O. Box 25-091).

Computer Point is also the New Zealand agent for the Torch computer itself, which could be described as a BBC computer combined with a Torch Pack plus a built-in screen and modem all housed in a solid metal cabinet.

Thus the Torch has two processors (6502 and Z80A), 64K RAM, twin 5¼ inch floppies (400K capacity each), the CP/M compatible operating system called CPN in ROM, a sound generator, parallel printer port, RS232 serial port, Econet port (for local area networks) and detachable keyboard.

The screen is a 12-inch colour monitor which in a preview for BITS & BYTES displayed good graphics and resolution.

But it is perhaps the built-in modem, together with communications software called Torch Mail, which offers the most exciting possibilities. Together, they provide an electronic mail capability or long distance computer to computer communication along telephone lines.

However the Post Office must first give "type approval" for the modem and this is being sought.

A full review of the Torch, which is expected to cost around $9000 in New Zealand, will appear in BITS & BYTES soon.

A short circuit

Observations by PIP FORER on microcomputers in England and America.

Thanks to an invitation from the International Geographical Union's Commission on Geographical Education and generous support from the University of Canterbury I was able to spend much of April in England and pass, briefly and en route, through the West Coast of the United States. My main purpose was to pursue my research and teaching interests in computers in education. Inevitably I was also able to observe much that was happening in the field of microcomputing in general. This short set of articles reports on some of the newer trends in overseas computing.

Los Angeles is not quite the El Dorado of things computational one might expect. Hungrily scanning the airport and downtown book stores revealed no further wealth on computer magazines.

I also began to encounter in Los Angeles the twin worlds of microcomputing overseas: the world of advertising and the world of reality. One objective in stopping in L.A. was to assess with a hands-on approach some software that I had seen advertised for some time in "Byte". Most of my needs I eventually met either here or in Britain but one product typified what Americans love to call "the state of the art". The product was well and truly advertised and established a reality in the perceptions of the community of microcomputer users. . . except for any who had tried to buy it. "Not yet released", "Under modification", "A month's waiting list" came back from the computer stores.

There was one other passing comment on Los Angeles. For the largest city in the state that is popularly seen as the centre of information technology (and thence with a head start in the movement to the information society) the information availability in the real world emphasised the gap between the hype and the man in the street.

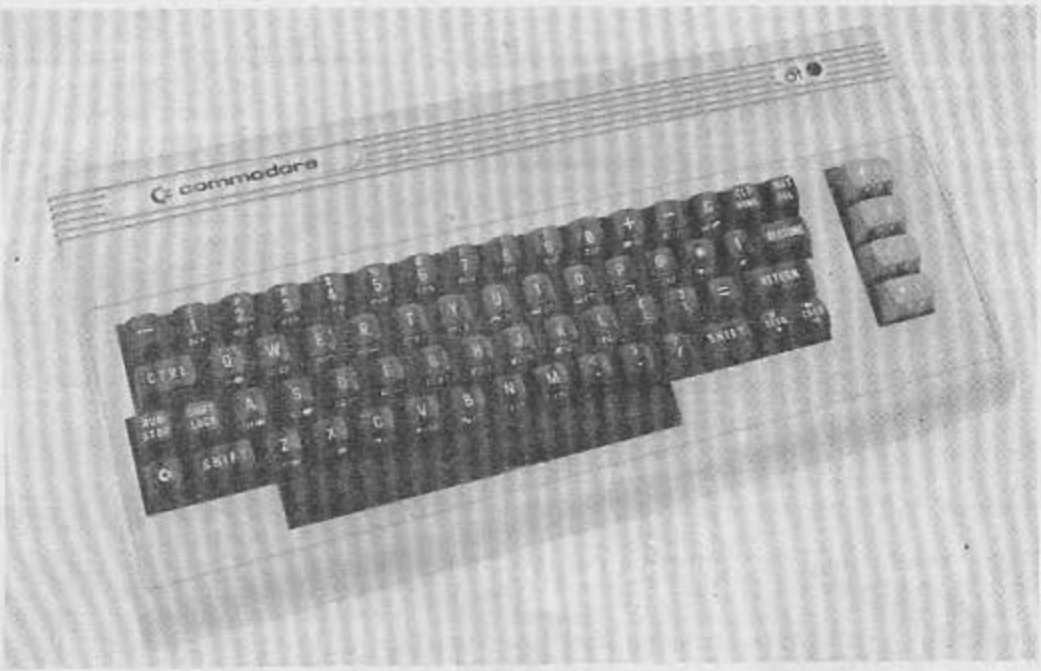
Crawley rules, O.K.?

The first surprise of the United Kingdom comes after half an hour when stopping to get a copy of "The Times" on the way to my base camp in Crawley, a relatively small New Town 40 minutes south of London, renowned only for its unfortunate name and a nature centre that breeds the rare White Park cattle. It certainly has no place on the world map of microcomputing. Yet in a run-of-the-mill newsagent I found not only the United States magazines I missed in L.A. but at least 20 British ones.

My first reaction was that this apparently typical newsagent was owned by a microcomputing fanatic. However, later experience suggests this shop is typical.

Certainly the emergence of at least three *weekly* magazines devoted to general popular microcomputing implies a high level of activity. From what I could see not only did these magazines run to 40-50 pages but they had no trouble in finding sufficient copy. Since each week one reviewed at least one and often two completely new computers you can gauge the level of new manufacturing activity. Many of these machines are small business machines, but the range of cheap personal microcomputers is also expanding very rapidly, particularly in the under £200 area. There are also now some 60 16-bit microcomputers available in the small business price range, most very similar to each other.

One feature is that British machines are competing far more



The 64 from Commodore.

This is the new Commodore 64 Personal Computer.
It costs $1295. Not bad for a brilliant piece of technology with a 64K memory.
But then, it's a Commodore.
And as one of the world's leading high-performance micro-computer companies, we're not exactly unknown when it comes to outstanding achievements.

LOOK AT THESE FEATURES FOR EXAMPLE

1. A total memory capacity of 64K, 38K directly available to BASIC. When not using BASIC a full 54K is available for machine code programs.

2. Interface adaptors will allow the use of a complete range of hardware peripherals including disk units, plotter, dot matrix and daisy wheel printers, networking and much, much more.

3. A complete range of business software including word processing, information handling, financial modelling, accounting and many more specific application packages.

4. Other computer languages such as LOGO, UCSD PASCAL, COMAL and ASSEMBLER are being developed. Existing VIC and 40 column PET BASIC programs can be easily converted.

5. The powerful sound chip gives 3 totally independent voices each with a range of 9 octaves. User control over music envelope, pitch and pulse shapes provides the ability to make your Commodore 64 sound like a variety of musical instruments, solo or in harmony.

6. 62 predefined graphic characters plus full alpha numerics with upper and lower case letters, all available directly from the keyboard and displayable in normal or reverse video in any of 16 colours.

7. 40 column by 25 lines colour display. In high resolution graphics mode, a bit mapped screen gives 320 x 200 individually addressable pixels.

8. The dedicated video chip allows the use of high resolution multi-coloured "Sprites" (moveable object blocks). Sprites can be moved pixel by pixel, independently of anything else in the screen.

9. Sprites can also be set up in 8 "layers" giving full 3 dimensional effects with, if required, automatic collision detection between sprites and any other screen object.

10. Machine bus port will accept ROM cartridges for many applications, including business, educational, home and leisure software.

11. A second processor option using the Z80 gives the Commodore 64 the ability to support CP/M.®

HOW THE COMMODORE 64 LINES UP

FEATURES	
Base Price	$1295
ADVANCED FEATURES	
Built-in user memory	64K
Programmable	YES
Real typewriter keyboard	YES (66keys)
Graphics characters (from keyboard)	YES
Upper & lower case letters	YES
Function keys	YES
Maximum 5¼" floppy disk capacity per drive	170 K.B. to 1 M.B.
AUDIO FEATURES	
Sound Generator	YES
Music Synthesizer	YES
H-Fi Output	YES
VIDEO OUTPUT	
Monitor Output	YES
T.V. Output	YES
INPUT/OUTPUT FEATURES	
Cassette Port	YES
Intelligent Peripherals	YES
Serial Peripheral Bus	YES
ADDITIONAL SOFTWARE FEATURES	
CP/M® Option (over 1000 packages)	YES
External ROM cartridge slot	YES

COMMODORE COMPUTER (N.Z.) LTD
P.O. BOX 33-847, Takapuna, Auckland

or

Contact your local dealer

successfully than before, particularly at the cheap end of the market. Of the "under £1000" class nine of the top 20 were still American, but the chart position of many of these was falling and the majority were in the lower half of the table. There were two Japanese entries (and British micro manufacturers are conspicuously nervous of the Japanese). The remainder were British machines that took seven of the top ten placings in numbers sold over the counter (mail orders are not included). The first three places fell to British machines: the BBC, Sinclair's ZX81 and Spectrum. Also there were the boring but successful Dragon 32 (£200), the Forth based Jupiter Ace (£90) and a new £100 machine, the Oric 1. This latter represents the ultimate compromise between a computing and games machine, its BASIC including as verbs the sound commands PING, SHOOT, EXPLODE, and ZAP.

British machines did less well in the middle-range machines over £1000, three Japanese and six American machines leading sales in the top ten. The nearest thing to a pure British computer at that point was the ACT Sirius, at least manufactured in the United Kingdom and with a headquarters research and development branch there. . . and at least at number one in sales for some time. The IBM PC and DEC personal computers were released during March, as was the Texas Instrument Professional, but, as of writing, these had yet to make a challenge for the top spot. The ubiquitous Osborne portable and the Olivetti M-20 came in in second and third.

The Sirius, an 8088 based machine, is widely used and is an interesting piece of equipment that has attracted a good software base.

The other British machine of interest that seemed destined to enter the business top ten was the Torch computer. Based around a Z-80 processor running a CP/M compatible system and using a 6502 a la BBC to drive its peripherals the Torch offers a very interesting and flexible business option, greatly enhanced by the availability of a 68000 co-processor option. More on the Torch and Sirius next month.

Developments

The most interesting new machine developments to pinpoint, apart from the release of a number of American machines, must be the Lynx, the 480Z and the Electron. The Lynx is an already released home machine offering very good graphics at a bargain price. It is an example of the proliferation of machines at the lower end of the prices range.

A major event for educationalists in Britain has been the release of the Research Machines 480-Z. Its predecessor was expensive but worthy, and by dint of being British and available went into many educational sites at secondary and tertiary level. In a bid to compete in the market with the BBC the new machine is neater, cheaper, and fully networkable. The network was not available for demonstration at the conferences I attended but the machine was.

The Electron is the other arrival expected in June. From details leaked through the monthly Acorn User it will have many of the features of the BBC computer but at half the price or less. It is rumoured to sell at £150 and to include a full 64K, capabilities to link in second processors and uses BBC BASIC. The losses are two of the three sound channels, some speed and built-in interfaces (although these can be added on). As a lower cost entry point to the burgeoning BBC user community it seems assured of success. . . if only it can be marketed efficiently.

Which comes back to the gap between the advertising and reality. A content analysis of even British computing journals screams to the reader, "Caveat emptor". An appreciable amount of what is advertised is not available or fails to meet the necesary specifications when released. In the intense competition most manufacturers believe that to wait to advertise until you can actually deliver is to die. Hence a succession of hurried products and anticipatory advertising amongst budget machines.

Consumer standards largely go by the board.

With no trouble at all one can pick products that have been firmly advertised for six months or more and are still not available. Sinclair, with his microdrive, is no less guilty than most although his record with his machines is currently fairly good. A history of bungled launches, bad documentation and product recalls dogs a lot of the low-cost computer industry.

Inevitably the really interesting developments I encountered came through personal contacts at conferences and through visits to various centres. Amongst these must be numbered the new enhancements of the LOGO language, particularly the forthcoming Apple version using a new, cheap video enhancement board, and the developments in communications between machines. Which all gets down to the reality of how microcomputing power is being used in the real worlds of education, commerce and the home. Looking at this will form the basis of next month's report.

The first Australian personal computer show

A short, subjective, selective scan

By MIKE MOLLOY

Let's listen to some of the 32,000 people who visited the first Australian Personal computer show at the Centerpoint conference centre in Sydney.

Exhibitor: "... a great success ... lots of business ... lots of interest ... very professional organisation ... yes, well worth the cost ... oh yes, we'll be here next year."

A visitor (uninformed but interested):" .. yes but what do they DO . ."

His wife (hysterical) :" ... what do you mean — "in case you missed something" — You started from here and you've been right around three times and if you do it again, I'll kill you!"

A visitor (informed and impressed): " . . .Lisa . . . Lisa. . .Lisa . . ."

Organisation of the most successful computer show in Australasia began nine months ago. The projected attendance of 15,000 was comfortably passed before the afternoon of Day Two of the three day show and as the doors closed, the grins on the faces of the exhibitors said it all.

Star — The undoubted star of those three days was the Lisa from Apple. At last, the obsolete Apple II and the ill-fated III have a stablemate — and one that jumps two generations of operating systems.

Lisa truly is a management tool, with no obvious relationship to a desktop computer. The concept of "operating system" is anathema to its designers but the only way to describe the machine's operation is to say the operating system is totally transparent to the fortunate user.

Although not an implementation of Xerox's Smalltalk, Lisa provides an example of the way the language is intended to interface with a user. Multi-window operation, graphics and the use of a "mouse" to point to and implement the user's wishes are the essense of Lisa's approach.

The keyboard is used only for data entry with other functions chosen by manipulation of the mouse on the desktop. A screen cursor repeats the mouse's scurryings and the press of a single button on the mouse's back pops a sub-menu onto the screen. From this range of possible functions, the mouse again makes its choice and the appropriate activity is carried out.

Files are written redundantly. I watched as a file became corrupted. The screen showed "LISA IS CURRENTLY REPAIRING A DISK, PLEASE WAIT."

A 68000 chip addressing one megabyte of RAM (16K only of boot-up ROM) controls all these functions. Dual disk drives of 860K apiece come with the system but at demo time a five Meg hard disk was not seen to turn off and would probably be an essential part of the package.

Costs — Such convenience does not come cheaply. Apple has targeted its baby at a very specific market and this precise aim is reflected in some strange choices. The Australian price of $12,000 (sans hard drive) had those of us who wanted one immediately returning to the IBM stand.

Lisa is said not to communicate in ASCII although it may be able to to emulate various terminals for mainframe access. The machine is strictly for the person who wants control of company life without a secretary in on the act.

Regardless of its success now there is no doubt Lisa points the way to the future.

Apple also announced another version of its boring bread and butter; the Apple IIe. The redesign of the motherboard is apparently to enable new ALU chips to be substituted for the non-proprietary chips of the older machine. This is to allow easier control of the vast industry devoted to cloning cheap pears, oranges and wombats.

PAL colour cards are not needed now and you can select colour or black and white by a switch. The monitor ROM is completely different (mainly to support 80 column operation) and the new machine is said to be 90% software compatible with the old, which has been discontinued.

IBM continues its juggernaut progress. Rumours suggest IBM

PC sales are not up to expectation in Australia but IBM's expectations are not those of the majority of this world and any other manufacturer would be muttering about hot-cakes.

An avalanche of software continues with a magic little flight simulator program by Microsoft topping the bill. (Interestingly enough most of the software displayed on the IBM stand was games. Its computer is expected to be as much at home as a business machine).

IBM clones such as the JB 3000 from Pansonic are being found not as compatible with the big blue as advertised, although the Australian grown Columbia is a true workalike.

Osborne, after discovering how well its little portable was selling in Australia took over its own marketing. Its stand was the best organised and flashiest at the show, though the only new feature was enhanced disk capacity and a lower price.

Bare — Tandy's well patronised stand was also bare of new goodies. It is supposed to have Xenix working on the MOD 16 which should be (but isn't) the best selling 16 Bitter around. I call the Mod 16 the most expensive typewriter in my office but with the software at last coming forward, this excellent (and everywhere else in the world, well-priced) machine should keep Tandy in the black.

Radio Shack's image is changing for the better. It is losing market share in America and wants to do something about it. It has a MOD 4 arriving in 12-18 months with high res graphics, colour and an 80 column screen. A MOD 12, the real successor to the MOD 2, is in production.

As far as the New Zealand non-marketing of the Tandy range goes, Tandy would "quite like" to take over its own marketing but the Government insists on local manufacture. This is not sensible.

Other hardware to take the fancy of showgoers included the new Epson FX-80 printer. While answering existing Epson control codes, the new printer has more programmable fonts, a proportional space mode, easier access to bit graphics and 160 cps. Price is up 10% (to around $A950).

The Microbee — a home-made — was a nice piece of hardware running a colour board and projecting big sales. But the choice of a non-standard BASIC makes it's survival problematical, in my opinion.

Rumours — More rumours surrounded the BBC micro, a marvellous machine in theory and specification but with few of its innovatory features actually in production.

It is said Australian marketing is not being handled in a way appealing to the BBC (the owner of the rights to the machine). Certainly, the Australian price of $A1500 compares unfavourably with the UK figure of £399 and may drop with a change in marketing strategy.

Commodore's stand, apparently bereft of staff, displayed about 100 Commodore 64s and VICs.

The Sirius was displaying its tricks too. In its own way, it is as desirable as the Lisa with an ultra-friendly operating system and the benefits of familiarity combined with innovation.

Software on display was mainly ho-hum. The Microsoft flight simulator on the IBM competed with Jumbo for the TRS 80/ System 80 and Molymerx released Enbase, a fully relational Database for TRS 80 Mod 1/3.

A mainframe product sitting in a Micro, Enbase permits entry of data in any way and retrieval in any relationship.

From Jaycar came an unbelievably low priced robot arm — capable of being programmed by pretty well any micro, yet robust and sophisticated enough for industrial use. The $A5000 to buy it compares with the $A40,000 of any previous, comparable product. A New Zealand agent is being licensed to handle both this and a $A500 arm for the hobbiest to play with.

The show was essentially about hardware. Only three purely software houses — Microsoft, Molymerx and Software Source — were exhibiting. The Australasian market is still in the throes of hardware purchase, leaving the worry about what to do with it until later.

Stand space at these jamborees is expensive. It takes only a couple of computers to pay the rent, but a lot of software has to change hands to make a show such as this economical. Even so, the software vendors ultimately govern the successful integration of a computer into home or business and I expect the Second Australian Personal Computer Show to host a lot more software.

The Wizzard Of "Oz"

By ROB FULLERTON

The Wizzard computer is the latest personal computer to be offered by Dick Smith Electronics of Australia. Based on the ubiquitous 6502 processor chip, it is squarely aimed at the home computer market with a price and features to appeal to the first time purchaser.

The Wizzard supplied for review was the basic 16K machine with the optional cassette storage module. The computer comes well packaged in a two part polystyrene box including a separate transformer power supply, antenna switch and a BASIC ROM cartridge.

The new Dick Smith Wizzard Home Colour Computer

A brief instruction leaflet gives simple illustrations for connecting the Wizzard to your TV set and getting started. More detailed instructions are given in the accompanying tutorial manual called "Fun Way into Computers" written by Jamison Rowe. A BASIC instruction manual is included with the plug-in BASIC interpreter cartridge.

The Wizzard is housed in a low black plastic case and comes with a detachable QWERTY style typewriter keyboard with tan coloured moulded rubber keys. It is not supplied in New Zealand with the membrane keyboard and joystick option because of customs regulations.

Video Display

Designed to operate into a standard TV set the Wizzard comes with an RF modulator built in. The instruction leaflet indicates that it is tuned for channel 1. However, when I connected the computer together I found that the signal came up on channel 2.

The problem arises from the different allocation of TV frequencies in Australia and N.Z. Australia's channel 1 operates on 57.25 MHz whereas N.Z.'s channel 1 is on 45.25 MHz. The nearest N.Z. channel is channel 2 on 55.25 MHz which, with a little retuning, produces a satisfactory picture although some herringbone interference was evident on my set.

If you are using the family TV as your monitor and you live in Auckland, Dunedin or Palmerston North, which use channel 2, it would pay to tune up one of the unused channels rather than tune for the computer then retune when watching TV. The other possibility would be to alter the tuning of the modulator. The antenna switch supplied with the Wizzard allows the computer and the TV to be connected together and either selected by switch without having to change aerial plugs.

The video display is very sharp and stable with no sign of flicker when pressing keys or executing programs.

Keyboard

The keyboard layout is fairly standard except the SPACE bar traditionally at the bottom has been changed to a SPACE key at the right hand side of the board. The keys are soft moulded rubber and have an unusual "squashy" feel about them. They are a little small and closely spaced for someone used to a full typewriter keyboard but present no real problems. The standard ASCII character set in upper case is available.

The character designations are screen printed onto the keys which may tend to wear off with repeated use over time.

There is an audio feedback through the TV sound to indicate a successful key entry, which is useful as a reasonably strong push is needed to register the key. I had particular problems with the "U" key on the review system which failed to register unless pressed hard on the botton edge. The longevity of this type of calculator keyboard is unknown and contact problems may become evident with extended use.

At each end of the keyboard is a recessed 7 pin socket covered by a protective slide which can be used to connect joysticks to the computer.

Cassette Storage Module

The cassette recorder for program storage is custom designed to clip onto the left hand side of the Wizzard computer after the end panel has been removed. A small 7 pin plug connects the two together.

HARDWARE REVIEW

Once the recorder is locked onto the Wizzard case there is little need to remove it as they form a very tidy unit with adequate strength to be picked up as one.

The data transfer rate is quoted at 500 bits per second although the recording format is unspecified.

The cassette module comes with a demonstration tape which contains seven programs designed to show the versatility of the Wizzard. This tape without a doubt must be the most persuasive demonstration of a home computer I have seen.

Jazzy music and a distinctly Aussie voice (Dick Smith's according to Dave Milson of Dick's N.Z. store) guide the user through demonstrations of the Wizzard's colour, high resolution graphics and sound capabilities.

Since the cassette motor is under direct computer control the potential for the production of integrated audio-visual displays using a combination of speech and music on one channel and programs with high resolution graphics on the other, is enormous. Unfortunately the second channel is not accessible for recording directly and one would have to do some juggling between the cassette storage module and a separate stereo recorder to produce the desired result.

Colour, Graphics and Sound

One of the features of the Wizzard is its extensive ability in the colour graphics and sound departments. By use of the COLOR command you are able to change the colour of the entire screen background, the colour of the characters or the background colour for each character. Sixteen colours are available and can be used in any combination, although it is not possible to randomly assign different colours to each of the 256 possible character codes. The character set is divided into 16 groups of 8 characters, (from ASCII codes 32 to 159), and the colour attributes of each group may be individually assigned.

High resolution graphics are generated on a two level approach. The video screen can display 24 lines of 32 characters

and each of these 768 character locations can be addressed by the PLOT command which specifies the row, column and the ASCII value of the character to be placed in that position.

The high resolution feature comes from the fact that a character is divided into an 8 x 8 matrix of picture elements (pixels) and each of the 64 elements are invididually programmable. This produces the high screen resolution quoted in the specifications, i.e. 768 x 64= 49, 152 programmable elements.

A complete set of up to 256 custom programmed characters can be defined and stored in RAM for use with graphics or other programs. Of course unless you define your characters from your program you will loose the customised character set when the computer is turned off. By using the COLOR, PLOT and CHAR commands extremely complex high resolution graphics can be generated.

For sound generation the Wizzard has three independently programmable sound channels each covering a 2½ octave span with eight different note durations available.

The sound produced is very pleasant, not unlike a harpischord or muted piano and is certainly a much superior sound to some computers which use an unfiltered square wave for sound generation. All channels are programmed for note frequency and duration with a single SOUND command, so it is possible to play chords and melody simultaneously.

These sound and graphics features give the Wizzard the ability to produce remarkably sophisticated output limited only by the programmer's imagination.

Hardware

A brief look inside the case reveals a single printed circuit board with power and reset switches mounted to project through the case.

There is no direct provision for connection of a colour monitor although it could be quite easily done.

Software cartridges

The computer is designed to accept software cartridges into a 36 pin socket recessed into the right hand side of the case.

A variety of video games are available for the Wizzard overseas but, along with the joysticks, the customs department is presently holding up their importation into New Zealand.

A book of programs written specially for the Wizzard is available from Dick Smith for $9.95 which contains an assortment of games and graphics programs.

Wizzard BASIC

The Wizzard as supplied in New Zealand comes with a BASIC cartridge containing a 12K BASIC interpreter, complete with a comprehensive manual. From the instruction set listed all the usual BASIC commands are available but there are no apparent enhancements such as

MICROCOMPUTER SUMMARY

Name:	Dick Smith Wizzard Home Colour Computer. Price $495.
Manufacturer:	Video Technology Ltd. Hong Kong.
Processor:	6502A.
Clock Frequency:	2 MHz.
RAM:	16K bytes dynamic RAM, 1K bytes static video RAM. Approx 11K bytes useable. Expandable to 64K bytes with memory expandable module.
ROM:	2K bytes monitor. 12K bytes plug in BASIC cartridge.
Keyboard:	48 key QWERTY style. Plug provision for 2 joysticks.
Video Display:	RF modulator output compatable with monochrome or PAL colour TV sets. Displays 24 lines of 32 characters. Standard upper case ASCII character set.
Program Storage:	Optional tape I/O module using standard audio casettes. Data transfer rate 500 Baud. Price $129.
Graphics:	Programmable character generator. Up to 256 different characters may be defined by the user. Each character may have any combination of pixels in an 8 x 8 matrix and may be placed anywhere on a 24 x 32 screen. Total resolution 49,152 pixels.
Display Colour:	16 different user programmable colours. Screen background, characters and character background all independently programmable.
Sound:	3 channels with 2½ octave range and 8 different note durations. All sound directed through TV receiver audio.
Printer:	Optional Centronics-type parallel printer interface available shortly.
Review Unit From:	Dick Smith Electronics. 98 Carlton Gore Rd. Newmarket, Auckland.

WHILE.....WEND or PRINT USING.

Statements peculiar to the Wizzard are COLOR, CHAR, PLOT, SOUND and JOY, which implement the special features of the computer. The JOY command is used to return the position of the joystick and the "fire" button status. The programmer can use only the single letters from A to Z for naming variables and a similar range from A$ to Z$ for string variables. Two dimensional subscripted variables are permitted. When a number is entered into the first four positions of a program line, pressing the space key automatically skips the cursor forward to the sixth character position. This makes programming a little faster and produces a more readable listing as all the statements start at the same position. PEEK and POKE instructions are provided but are of little use as there is absolutely no information on the memory map or I/O port assignments. Persistent experimentation may bring important addresses to light (perhaps a future Wizzard column).

I had no difficulty getting some short programs to run. Runtime errors are flagged with an error code and the offending line printed. The BASIC manual lists 21 error codes. LLIST and LPRINT commands are available for output to a printer. A Centronics interface is due to be released soon.

The only significant limitation of this version of BASIC I can see is the restriction on the numerical accuracy of calculations. The interpreter operates with 6 digit floating point maths routines and can handle numbers in the range 0.00001E-37 to 9.99999E37.

However, since the largest number that can be displayed in non-floating point form is 9999999, or 9999.99 say for dollars and cents, it is unlikely that this restriction would make this version of BASIC unsuitable for serious accounting or scientific programs.

Conclusion

The Dick Smith Wizzard is an extremely talented performer and has all the features a first time home computer owner could require. The expansion options in the pipeline promise to make the Wizzard a well optioned personal computer. The calculator type keyboard is probably the biggest limitation as far as the hardware is concerned.

The present customs restrictions on supply of the joystick modules and games cartridges leaves the future of the Wizzard as an entertainment machine uncertain and whether there will be a large range of software to suit remains to be seen.

However, the Wizzard is very good value for money at $495 and must be a serious consideration for anyone looking to buy their first personal computer.

Italian micro enters New Zealand business market

By WARREN MARETT

Five years ago the Italian office equipment company, Olivetti, was losing about $100m a year and appeared to be heading for the scrap heap.

By firm financial controls and energetic management, Olivetti has once again become profitable and is now the largest office equipment company in Europe. With a big share of European and world sales of electronic typewriters, the company hopes to also capture about 10 percent of the European computer market. The Olivetti 16-bit M20 business computer will be part of this thrust.

Sold in New Zealand by the 18 branches of Armstrong & Springhall, Ltd, the M20 here is aimed at the business user. It also has software available that will make it popular in a number of vertical markets.

The M20 is competitively priced for a machine with its features (the basic unit with a monitor and two floppy disc drives costs $6850). The optional software products, of both a utility and application nature, are also very competitively priced.

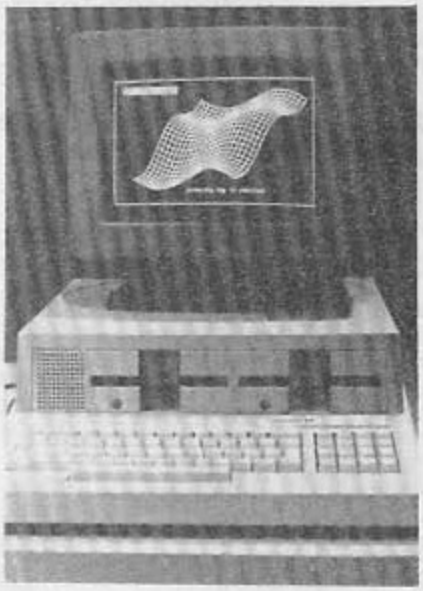
Its main disadvantages are low-capacity floppy disks (although their capacity can be doubled for an extra $2200 and a 10MB hard disk is available on three months delivery) and a microprocessor and operating system that are outsiders in a world turning increasingly to 8086s, 8088s,68000s, CP/M-86 and MS-DOS.

The M20 uses the Z8001 16-bit microprocessor and an operating system called PCOS (Professional Computer Operating System) that was developed by Olivetti.

However, to negate these disadvantages, Armstrong & Springhall already has a useful complement of software to run on the M20 and Olivetti is said to have available a CP/M emulator software feature and a hardware add-on to enable the M20 to run MS-DOS.

Additionally, the PCOS operating system has good features that would make it acceptable in any company.

Brian Arps, from Armstrong & Springhall, does not believe that the Z8001 is limiting the M20 in any way. "It s only practical limitation is that some people haven't heard of it," he told BITS & BYTES.



The Olivetti M20 business computer

The Z8001 drives 128KB of memory on the basic machine. PCOS takes up a surprisingly large portion of this memory, leaving about 42KB of user memory. There is no significant amount of ROM in the M20; all software is booted i.e. loaded into RAM from disk.

The initial booting procedure also includes a seven-second diagnostic check, which slows down the start-up process but is worth the delay

The keyboard, computer and disk drives are all in one unit, with the monitor normally sitting on top. This makes for a tidy, compact package.

It is an unusual keyboard layout. There is no delete key or tab key (delete is Control/H, tab is Control/I). There are two special function keys, labelled S1 and S2, and a command key that functions like an additional control key.

For software such as the Oliword word processing package, the Control and command keys are used in conjunction with the top row of the keyboard to provide 12 + 12 special function keys.

The tiltable and rotatable screen is clear and easy on the eyes. Most of the utility software uses a format of 64 characters by 16 lines but this can be easily changed (by an operting system command or software command) to 80 characters by 25 lines.

The bit-map graphics uses a 512 by 256 pixel format which gives good diagrams, particularly obvious in the demonstration of the numerical control software.

PCOS is easy to use and well documented. Commands, such as VLIST to list a volume directory, are easy to remember and can be abbreviated to two characters. Wild-cards and wild-characters can be used in file name specifications.

In particular, there is evidence of a well-designed and friendly system. At first only two digit error codes were being displayed, but we soon found out that an error message module can be loaded into memory to display full error messages. Help facilities are available, although these were not provided on our demonstration disk.

A reasonably good screen editor is provided with PCOS which overwrites the operating system when it is called into memory. Perhaps this is because there is not a great deal of spare memory in the basic system.

Utility commands are usually not resident in memory but can be made resident for better response.

The PCOS manual is very well laid out but could do with a comprehensive index. An unusual diagrammatic method is used to show the syntax of commands; it is no doubt an unambiguous method but a little tiring.

BASIC on the M20 is the 5.2 version of Microsoft BASIC, with special extensions for graphics and the IEEE interface.

The principal graphics features are multiple windows (up to 16), points, lines, boxes, circles, ellipses, polygon fill, absolute and relative positioning, and scaling.

The BASIC has constructs such as FOR. . .NEXT, WHILE. . . WEND, and an assembly language CALL feature.

Again, the BASIC manual is good but could do with an index. (A quick-reference card is provided for BASIC and there are similar cards for other software.)

Oliword, the word processing package, would be amongst the better class of microcomputer word processing packages, with good informational messages often on the screen and a handy set of functions available through the top row of keys on the keyboard.

The business software goes under the name Olibiz and came to New Zealand by way of Australia. A utility disk is used to adjust parameters to meet the user's requirements, such as the space trade-off between the maximum number of debtors and the maximum number of stock lines held on disk. (The basic systems can handle a maximum 730 debtors or 1700 stock lines.)

A quick demonstration of the main business packages showed some useful features for the small business user.

Brian Arps also demonstrated the GTL package, billed as a Computer Aided Design package

Turn to page 33

Microcomputer Summary

Name:	Olivetti M20
Microprocessor:	Z8001
Clock speed:	4 Mhz
RAM:	128KB expandable to 224KB
Input/Output:	White phosphor monitor Dual 5¼ inch floppy disk drives, each 286KB RS-232 interface 50 – 9600 baud. Parallel printer interface, Centronics compatible.
Keyboard:	Full typewriter-style keyboard with 72 keys, including numeric keypad, top row is user-programmable, two control/command keys, and two additional special function keys.
Display:	64 characters by 16 lines or 80 characters by 25 lines (user-selectable and software-selectable).
Languages:	BASIC (version of Microsoft BASIC release 5.2, interpreted), Assembler, FORTRAN, Pascal (coming), COBOL (coming).
Graphics:	Bit-map, 512 by 256 pixels, supported by BASIC.
Sound:	Built-in speaker for raspberry only.
Cost:	Basic unit, including monitor, two floppy drives, operating system, BASIC, and other input/output features above, $6850.
Options:	IEEE-488 interface, Two extra RS-232 or 20ma interfaces, 32KB memory increments, $430, Floppy drives with double above capacity, approx. $2200 extra. Hard disk drive, 10MB (total system price then approx. $17,000).
Software:	PCOS operating system standard. Olibiz accounting packages, $400 – $600; Oliword, word processor, $400.
Peripherals:	PR 1450 printer, dot matrix 100 cps, $2450, PR 430 printer, daisy wheel, $5640.

VisiCalc — the original and still hard to beat

By PETER BROWN

VisiCalc — the original and best known of the electronic spread-sheet programs discussed last month — is the main product of VisiCorp (formerly Personal Software) and is available in versions for all the main brands of personal computer.

To use VisiCalc, you will need a microcomputer with at least one disk drive, no less than 32K RAM, and, of course, the VisiCalc program diskette and appropriate manuals. A printer is an optional, but very worthwhile, extra that allows VisiCalc to be used for preparing reports, tables and the like for distribution to others.

You will also need to be prepared to spend quite a bit of time learning to use the spread-sheet, and becoming familiar with its rules and many built-in functions.

Purpose

These functions allow you to use VisiCalc for just about any purpose. It was designed, however, as a budgeting, financial planning, and forecasting tool for small to medium-sized businesses, and for individuals. Engineering, scientific, and statistical applications are also possible with VisiCalc.

Getting started is easy. The manual that comes with the program has a set of four lessons introducing the user to the basic features of the software.

These start with advice on accessing the various parts of the spread-sheet, and formatting it to your own needs. They move in reasonably easy stages to using some of the more complicated commands.

A reference section describes each command in more detail — including a number of commands not covered in the tutorial section.

Illustrations

Each new concept is illustrated with examples which, in most cases, give a fair idea of how it will work in practice. There are sections showing how the VisiCalc program uses the keyboard (some keys are used in special ways), how to "back-up" (make spare copies) the diskettes you use, and even a good explanation of how VisiCalc uses the microcomputer's memory — if you're interested in that sort of thing.

The manual claims you can pick up the elementary features of VisiCalc in an hour or so. This depends on how you define "elementary" and how much experience you have with microcomputers. Along with other electronic spread-sheet programs, VisiCalc is not suitable for inexperienced users.

Even the step-by-step instructions in the manual require an easy familiarity with computer keyboards and display units. Without this, you will quickly become lost in the maze of input instructions.

To use VisiCalc efficiently and effectively calls for practice, patience and more than a little mathematical ability. All spread-sheets, electronic or not, use numbers and formulae to build models of the real world, and manipulate these models to indicate likely effects of changes in the business's environment.

Electronic spread-sheets not only allow rapid assessment of the effects of small changes in your model, but they encourage you to develop very complex models.

Commands

In this, VisiCalc performs very well. Its large range of commands and built-in functions — some of them very powerful — will let you build some very useful models of your world. Other features allow you to edit, update, and format your work, and save the results on diskette or print it out if you have a printer attached.

VisiCalc, however, is not especially "user-friendly". You will need a good grasp of basic mathematics to construct workable formulae (if you find tax returns confusing, you'll have problems with this), and a thorough knowledge of the manual is essential to ensure the various rules are followed and the most appropriate commands or functions used.

Your best bet is to keep reminding yourself that VisiCalc is a special computer language, like BASIC, Pascal, or COBOL, and teach yourself to use it the same way you learned these languages.

If that means a bit much, then ask (or pay) someone else to help you set up the spread-sheet using your knowledge of your application, and their skill with VisiCalc. Once everything is set up all the equations and relationships sorted out, the actual entering and manipulating of your data is easy and needs no particular expertise.

Popular

Electronic spread-sheets are reputed to be the most popular type of software for use with microcomputers, including personal or home computers. VisiCalc, the first of these to be mass-marketed, has achieved a deserved reputation for efficient problem-solving where large numbers of figures, with complicated relationships, are involved.

It's particularly useful in small businesses where, once the spread-sheet has been set up, it provides a cheap and effective method of allowing the owner or manager to prepare forecasts, budgets and other projections.

Remember, however, that VisiCalc deals with numbers only. It cannot be used for handling text (though it can usually be interfaced with word processing programs), and although it has a limited (and pitiful) graphics capability, most of the output will be in the form of tables.

The version of VisiCalc reviewed here is the standard version (there are now enhanced versions for some machines). Its tax-paid price is $500, although this varies from shop to shop.

Chartered Series one of best

By JOHN J. VARGO

The growing availability of microcomputers and their increasing affordability makes the need for good quality, reasonably priced software all the more urgent. To have custom software written for your particular need would be expensive, often running 5 to 20 times as much as "off the shelf" software. Whats – more the prepackage variety will usually be more reliable as it has been tested by a number of previous users.

The Chartered Series of software, produced by Interactive Applications Ltd (IAL) of Auckland, is one of the most widely used accounting software series in New Zealand, and is tailored to New Zealand conditions.

It is a good example of the "off the shelf" software, and the cost effectiveness and reliability this type of software can produce.

IAL software runs on most microcomputers under the CP/M and MS-DOS operating systems which encompasses most 8 and 16-bit machines. It costs between $900 and $1100 per module, with some discounts available for multiple applications.

The Chartered Series of accounting software includes a wide range of applications packages which are integrated to the general ledger and other sub-systems where necessary. This list includes most of the application modules now available in the series:

General ledger; order processing; fixed asset; inventory control purch; creditors ledger; debtors sales analysis; payroll; invoicing; time control; bill of materials; hire purchase; job costing.

This very comprehensive series is sufficiently flexible to lend itself to most retail, wholesale, service and manufacturing concerns.

Applications specifically reviewed included the general ledger, debtors sales analysis, and inventory order processing systems.

General Ledger

The general ledger system allows you to set up a chart of accounts to suit your business, and produce the reports you need in the format you require.

Integration of the creditors, debtors, inventory and other systems with the general ledger system allows you to enter your transactions in the appropriate journals for each system, and all posting will be done automatically to subsidiary ledgers as well as to the general ledger.

Other features include

password control allowing three levels of access to the system.

Level one allows read only access (no changes of data may be made); level two allows all necessary changes to be made to data but no access to system parameters; and level three allows even the passwords to be changed.

This password control applies only to the general ledger and creditors system.

All systems are menu driven, with selectionof the function you want made from a menu listed on the screen. When selecting from options or filling in certain required information, the programs will often give default values that would be the most often chosen option or value.

The manuals are very professionally presented and easy to follow. In addtion, each manual provides useful suggestions on setting up the system to meet your needs. In the case of the general ledger system, how to set up a charge of accounts is covered thoroughly, as well as how to use the built-in report writer.

From the stand-point of internal control, use of passwords is an excellent procedure. It is just unfortunate the password control has not been implemented on the other modules in the series.

Debtors

The debtors system was easy to use (as was the general ledger system) and the manual very helpful. When keying in data, all fields requiring dollar input will automatically have the decimal point placed for dollar and cent notation. This saves the need to enter decimal points and can be quite useful.

All systems allow you to stop the printing process in mid-stream when printing reports — particularly useful if, in the middle of printing a hundred-page report, you discover you do not really need it or you have forgotten to post a batch of transactions. It can be most annoying to find yourself in this position and unable to abort the printing operation as is the case with some software.

Actually, forgetting to post a batch of transactions is a most unlikely occurance with this system. The posting occurs automatically after you finish entering a group of transactions, before you are allowed to exit from the system. In addition, an audit trail report is generated immediately, letting you (and your auditors) know which transactions have been entered.

When inquiring of the debtors system or entering transactions, you may access the files for a particular debtor either by customer number or by an alpha key (which would be the first part of the customer's name).

This useful feature is complicated only by one small ideosyncracy — the alpha key must be entered in all upper case letters. This is unusual as other data may be entered in upper or lower case letters without apparent distinction.

I found this application pleasant to use, and in about one hour, I was feeling almost at home with it.

Inventory order processing

Because the inventory and order processing systems are integrated with each other (as are most of the systems in the series), when entering a new order for a customer specifying the products and quantities ordered, the program will interrupt you with a beep and tell you the inventory on hand is not sufficient to fill the order, and "would you like to back order"? Naturally, this is only done if in fact the inventory level is not sufficient!

This is the way software should be written! On top of this the system will do a similar trick if the customer has over-run his credit limit. Very nice.

The system, in conjunction with the invoicing system (integrated naturally), automatically generates customer invoices on request for all confirmed orders (those filled) or for specific invoices requested. This is a very professionally presented and thoroughly designed system and will prove to be one of the most useful for many firms.

Summary

Each manual for this series includes sample reports and menus for each application. Generally, the report layouts are easy to follow and well presented, as you can see from the sample inventory system menu.

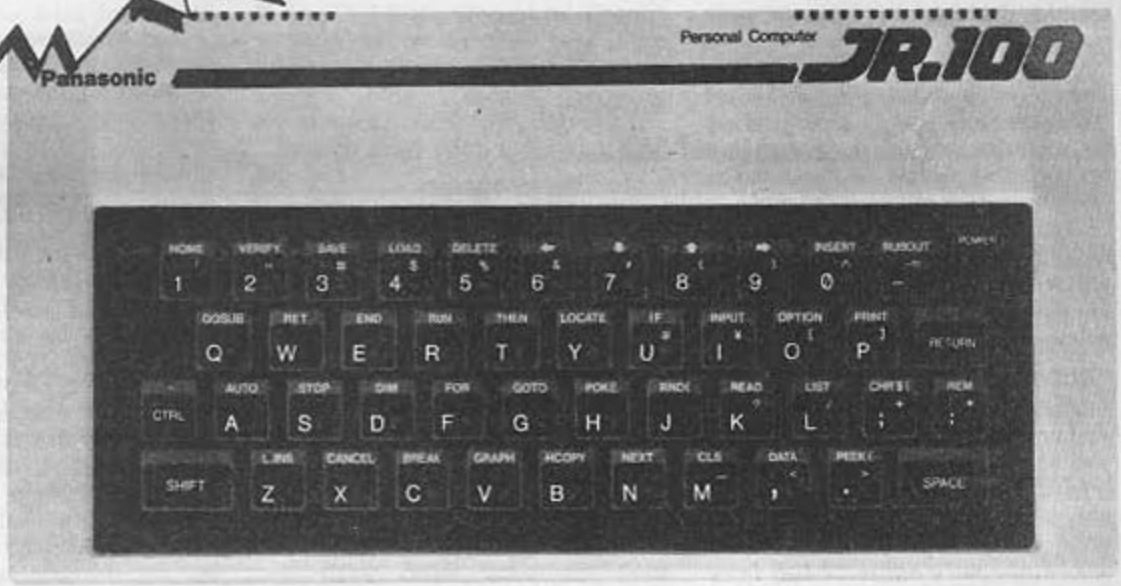
As with any system which is new to you, you need time to get acquainted. But you will find settling-in time small with this system of comprehensive business applications. In spite of a few ideosyncracies, this is one of the best series of accounting software on the market for microcomputers — and in fact many mainframe manufacturers might be jealous.

```
                    ** INVENTORY SYSTEM MENU **

*****************************************************************

  1 = MAINTAIN INVENTORY MASTER      8 = PRINT OUTSTANDING ORDERS
  2 = MAINTAIN SUPPLIER FILE         9 = PRINT COMPLETED ORDERS
  3 = MAINTAIN GROUP/AREA/TAX       10 = PRINT STOCK STATUS REPORTS
  4 = INVENTORY ENQUIRIES           11 = PRINT REORDER RECOMMENDATIONS
  5 = LOAD INVENTORY TRANSACTIONS   12 = PRINT STOCK SALES REPORT
  6 = MONTHLY / ANNUAL UPDATE       13 = PRINT PRICE LIST
  7 = PRINT STOCK FILE MASTER       14 = PRINT STOCKTAKING LIST
                                    15 = PRINT AREA/GROUP ANALYSIS


                    0 = END INVENTORY PROCESSING

                        ENTER OPTION: 0
```

Figure 1 Displaying Inventory System Menu

MEC

Panasonic



FUNCTIONAL SPECIFICATIONS

- Microprocessor
  Model: MN1800 (equivalent to 6802)
  Clock frequency: 890KHz
  System Reset Function
- Memory
  ROM: 8K Bytes
  RAM: 16K Bytes
  Video RAM: 1K Bytes

- Keyboard
  System: Software scanning
  Keys: 5-shift key mode with 45 keys, SHIFT key and CTRL key
- Display interface
  Screen size: 24 lines × 32 characters
  Characters: 64 characters with 6×7 dot matrix
  64 semi-graphic characters with 8×8 dot matrix
  Characters & symbols specified by user: 32 characters with 8×8 dot matrix
  Attribute: Inverted display function
  Composite video signal: with 75 ohms, 1V p-p or with RF flip-flop converter
- Cassette Interface
  System: FSK system 1,200Hz (space), 2,400Hz (mark)
  Baud rate: 600 Bauds
- AC Adaptor
  Input Voltage: AC 110V, 120V or 220V ±10%, 50/60Hz
  Output Voltage: DC 17V, 7.8V and −8V
  Power Consumption: 12.5W
- RF Modulator

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TELEPHONE (9) 504-774.

Running a weather eye over programs

By CHRIS McLEOD

What should you look for when buying software? Remember it is best to decide what software you should use before buying your hardware.

Look for the software first. Then, once you know what software you want, look around for a computer which will be able to run the software you have chosen.

There are several things you should look for when buying software. They are, with a few details on each:

• Does the program meet your requirements

Make sure the program does all you want it to do. Advertisements and specifications will give some idea of what the program does, and whether it is likely to meet your requirements. You should also make sure some of the finer details you are looking for are available.

Sometimes, problems can arise if the terminology and units used in the program are different from those you are used to. If they are different, you may have to consider changing or maybe, have the program changed to suit your needs.

Make sure the program is not too simple for what you want to do, otherwise it may be of little use to you. On the other hand, programs which are more complicated than you need can be a nuisance because you may have to enter a lot more data than necessary, and have to put up with a lot more output than you need.

After you have decided the program to suit your requirements, make sure it is capable of handling the amount of data you will be entering. For example, a diary herd recording program able to record information for 200 cows is of little use for a dairy herd of 250.

• Is the program technically correct?

Although it is unlikely with programs that have been in use for some time, it is possible to come across programs which give incorrect answers. The more complicated the calculations in a program, the more likely it is to have mistakes.

The only way to make absolutely sure there are no technical errors is to work a few examples through by hand, and then compare them with the results from the program. If the results are nearly the same, but not quite, rounding errors could be occuring.

If the difference between the computer results and the hand worked results is significant, be very suspicious of the program's accuracy — although you should check your own figures. It is probably best to get programs which have been designed and programmed by people with a good knowledge and experience of farming.

• Is the program easy to use?

A program which is difficult to use can lead to more errors, and is less likely to be used as often as it should. It will also take longer to learn to use it, and then, longer to do the same job than with a program which is easier to use.

One of the most important factors is that the screen layout should be clear, easy to read, and uncluttered. Usually, the more menus there are, the easier it will be to use the program. The instructions given on the screen should be easy to understand, and the answers required should be logical.

It is much better if the formats used for the screen are standard throughout the program, and the responses standardised. For example, if a program has several places where you may want to exit, the command should always be the same.

Data entry should be easy, and not involve more than is needed. Once the data has been entered, it should be easy to correct any errors, preferably before the data is removed from the screen. Corrections should be made at the position where the data is placed on the screen, not elsewhere on the screen. This is to make sure the right item is corrected.

If data is to be entered relating to information collected elsewhere in the program, the related data should be displayed somewhere on the screen so that you do not have to refer to notes.

These comments also apply when you are updating information. The data which you are updating should be displayed somewhere on the screen so that you do not have to refer to notes.

These comments also apply when you are updating information. The data which you are updating should be displayed on the screen, as well as the new data. If applicable, running totals should be displayed as well.

If possible, validation of the data you are entering should be carried out. This involves checking the data you are entering

to make sure it is what is expected.

A good example is entering a date. If you enter a date greater than 31, or a month greater than 12, you should be made to enter it again, because you have entered a figure which is obviously incorrect. Such checks are sometimes known as "idiot proofing".

A good indication of whether a program is easy to use or not, is for someone with a good knowledge of the field for which the program was written to sit down and use the program. If that person cannot understand what is required and does not know what to do next, the program is probably not too "user friendly".

• How good is the program documentation?

Documentation should be provided with the program. It should explain what the program does, how it is used, and what to do when things go wrong. Documentation should be easy to follow, and if any parts of the program are difficult to follow, it should clearly explain what is required.

It is much better if the documentation has to be referred to only occasionally. Constant reference to it is an indication that the program is not as easy to use as it should be.

Any complicated calculations should be specified in the documentation so that you can check to ensure they are doing what you want.

• How well is the program supported?

When you take delivery of the program, will there be a training session included to teach you how to use it? If there is, this is probably the best way to get started. If not, the next best thing is to have easy access to people who can help you out it you get into difficulties. This could be another user in your area, the person who sold you the program.

If you have access to the writer you are much more likely to have any required changes made to the program.

The most important aspects of program support relate to program "bugs" and changes to the program because of new circumstances. If any "bugs" are found (and this is not uncommon), will the program be corrected, and what will be the cost? Most programs come with a guarantee that any "bugs" will be corrected at no cost to the buyer. If this guarantee is not given, be careful.

Changes caused by changing circumstances can be illustrated by an example. If the program includes calculations to allow for depreciation, these calculations will have to be changed if depreciation rates are changed by the government.

Some programs will be set up to allow the user to make the appropriate changes; others will require the program to be changed by a programmer. If this is the case, make sure you have access to the firm which wrote the program. Source code is program in the form which can be understood and changed by the programmer. Many software firms do not release the source code for their programs in an effort to reduce software piracy (theft of the programs).

• Are the reports from the program suitable?

The program output — to the screen or to a printer — should be laid out so that it is easy to understand. Presentation of information in the output can vary considerably. It does not have to be in the same order as when entered.

Unless there is only one way to logically present results, it is better to have a choice of several reports, so that you can select the most suitable at the time.

It is often useful to have some of the output on the screen instead of on the printer, to check that things are correct for printing out, or perhaps to save having to print anything out.

COMPREHENSIVE GUIDE TO FARM SOFTWARE

New Zealand Source/ Dealers	Package	Description	Price	System Hardware	User Memory Required/
Agrisoft Limited, P.O. Box 197, Carterton. Agents and dealers for the following machines; NEC, Hitachi Peach, Poly. For the System-80 and TRS-80's, contact Agrisoft Ltd, P.O. Box 197, Carterton.	Farm Forecast Budget	Menu controlled programs for producing an annual forecast budget and cash flow. Adjustments to derive taxable income included.	Dairy $520 Sheep $660	TRS-80 I&III System 80 Poly Hitachi Peach NEC PC/8000	20K Disk or tape, except cropping where requires disk
	with Mixed Cropping	As above, but allows for up to 50 crops and 20 fertilizer entries per crop. Can be used as a paddock recording system.	$760	As above	32K Disk
	Horticultural Forecast Budget	Similar to combination of above, except that the 20 entries for fertilizer can include sprays.	$650	As above except for NEC	20K Disk or tape
	Cash Book	Monthly cash book of receipts and expenditure which is reconciled with bank statements. 30 headings allowed for expenditure, 16 receipt headings for farm version, 37 receipt headings for horticultural version.	$270	TRS-80 I&III system 80 Poly Hitachi Peach	24K (27K for Hort.) Disk or tape
	Personal Balance & Equity Analysis	Equity (or net worth) is established as a percentage of total assets and on the basis of all farming assets less farm liabilities.	$105	As above including NEC	16K Disk or tape
	Ewe Flock Composition	Calculates the number of ewes required to maintain a stable ewe flock with balanced ages.	$50	As above excluding NEC	16K Disk or tape
Computer Concepts, P.O. Box 861, Masterton.	Farmware Farm Data	Reads data stored on a MSI/55 data logger and either prints it out or stores it in a PIPS page.	$250	Sord M23 DBASIC	? Disk
	Farm Finance	Two parts: Cash book and budget or prediction of cash flow. Cash book entries are posted to a summary according to a given code.	$200	Sord M23 PIPS	? Disk
	Farm Report	Will record all significant information for typical sheep and beef farm. Various production indices are then calculated. Can be used to rank farm against farm or year against year.	$250	Sord M23 UBASIC	? Disk
	Farm Feed	Easy-to-use program which allows feed demand and supply to be estimated and changed at will. Allows for different shearing and mating dates.	$250	Sord M23 (II) UBASIC	? Disk
	Farm Fence	Will list materials necessary for a specified type of fence of given length. Can be used to compare the cost of different types of fence.	$50	Sord M23 (III) BASIC & Epson HX20 Microcassette	? Disk
	Farm Manager	A simulation of a small farm in a lamb fattening enterprise. Illustrates correlation between stocking rate, sheep performance and feed management.	$100	As above	? Disk
Kellogg Farm Management Unit, Lincoln College, Canterbury.	Cash Flow	Monthly actual and budget comparisons as well as monthly and cumulative balances.	$90	CP/M Basic 80 8" disk also Apple II with CP/M, NEC, North Star, Sanyo 1000, Sharp PC, TRS-80 III (for a limited range of packages) Xerox	64K total Disk
	Dairy Analysis	Town supply forecast of monthly milk production and income for different calving patterns etc.	$250	As above	As above Disk
	Financial Recording Scheme	A complete and flexible fully integrated financial managment system.	$600	As above	As above Disk

	Gross Margin — Sheep breed	A detailed forecast enterprise budget for sheep flocks where replacements are bred.	$250	As above	As above Disk
	Gross Margin — sheep buy	Similar to above, but where replacements are bought in.	$250 ($350 for both)		
	Gross Margin — cattle	Similar to above but for breeding herds selling stores	$200	As above	As above Disk
	Gross Margin — crop	As above but for any crops	$250	As above	As above Disk
	Investment Analysis	Analysis of multiperiod cash flows giving true interest rate, payback period and cost-benefit ratio	$50	As above	As above Disk
	Metric-Imperial Equivalents	Converts a range of commonly used ag. units from metric to imperial and vice-versa	$50	As above	As above Disk
	Mortgage Analysis	Calculates repayment details for any table mortgage	$30	As above	As above Disk
	Stock Reconciliation	Enables keeping full records of stock movements and numbers for user selected types and classes	$50	As above	As above Disk
Farm Plan (NZ) Ltd, P.O. Box 1838, Christchurch. Farm Plan (NZ) Ltd. Access Data & Agencies (NZ) ICL Trader Point (NZ) Computer Point (ChCh) Micro Age (ChCh)	Farm Business Management System (F.B.M.S.)	A fully interactive production and financial planning and control system with extensive information storage and reporting capabilities. The system is set up to suit all types of farming; Off farm investments and interests can be included. — financial and information system — three extra stock files — paddock programs — dairy, calving, milk prodn & value Complete system ++	 $1300 $250 $700 $250 $2500	CP/M	64K total Disk.
Under a special offer, if a complete package is bought before 30/9/83, all future Farm Plan N.Z. software will be available free.					
Bernard Pinney, Dunrobin Station. R.D. 2, Lumsden.	Farming Templates	Visicalc templates for gross margins (sheep & deer), land development costs, velveting, tailing analysis and labour.	$200	Apple with advanced Visicalc	51K Disk
Primesoft, Primary Software Ltd, P.O. Box 324, Timaru. There are 30 Vic dealers throughout the country who sell Primesoft software.	Dairy Farm Pack	A five program pack containing a financial forecast for town supply or factory supply, a monthly cash flow projection, a dairy cow profitability margin, a dairy beef profitability margin and a calving schedule	$495 (standard) # $619 (expanded) #	Vic 20	# standard 20K # expanded 28K Disk or tape
	Sheep & Beef Farm Pack	A five program pack containing an annual financial forecast program, a monthly cash flow projection, a ewe profitability margin program, a stock buy/sell profitability program and a stock recording and selection program	$495/619	Vic 20	# expanded 28K Disk or tape
	Cash Book	A flexible cash book allowing up to 15 deposit codes & 60 payment codes. For the 16K expansion up to 175 transactions are possible, while 500 per period are possible for the 24K expansion.	$145/175	Vic 20	# expanded 28K Disk or tape
	Monthly Cash Flow Projection	Provides a monthly cash flow allowing up to 15 income headings and 45 expense headings which the user defines.	$130/160	Vic 20	# expanded 28K Disk or tape
	Crop Profitability Margin	Used to calculate the profitability of alternative crops, includes sensitivity figures	$130/160	Vic 20	# expanded 28K Disk or tape
Rural Computer Systems, P.O. Box 1136, Christchurch. Demo disks are held by Apple dealers who place orders with Rural Computer Systems.	Farmplan Financial Package	A comprehensive and flexible financial recording and analysis system	$2250	Apple IIe	48K total Disk
	Ramplan	Used for selection of breeding sheep	$1400	Apple IIe	48K total Disk
	Beefplan	A recording package which can be used for management purposes as well as for recording	$1400	Apple IIe	48K total Disk
	Dairyplan	Gives physical and financial reporting on the herd as well as for individual cows	$1400	Apple IIe	48K total Disk

Systems simulation

By CHRIS McLEOD

What is systems simulation, and how can it be used on farms?

Let's define what we are talking about. A system can be defined as "a group of objects united by some form of interaction or independence to perform a specified function." If we were to look at a sheep farming system, we would note many objects (sheep, grass, rain, labour, management, grass grubs etc.) which form the system and perform the functions of producing meat, wool and income.

Systems simulation — where a model is constructed which represents the system under study – has been used for several years in various disciplines.

We are all familiar with the use of wind tunnels in designing aircraft. A model of the aircraft is constructed, then placed in the wind tunnel. By altering the air speed and the altitude of the aircraft model, engineers can get a better idea of how the real aircraft will fly.

Models used in systems simulation can be physical (as in this example) where the model looks like the real thing, or symbolic, using mathematical or logical operations to mimic the system under study. Symbolic models which can be programmed to run on a computer, are useful in farming.

As microcomputers are becoming cheaper and much more powerful, it will not be long before farmers can afford a computer on which useful system simulation programs can be run. The benefits are many and varied.

If you want to find out whether you should change your farming policy to improve some aspect of your operation, what do you do? You could ask an advisor, you could ask another farmer who farms differently to you, or you could just try out a new policy.

Each option has its problems. The advisor may not be completely familiar with your aims, or with your present farming situation. Other farmers may have different aims and give advice which does not suit you. If you experiment with other farming systems, many years could pass before you have enough information to make a choice.

If you had a computer model of your farm, you could try each of different systems and compare the results. You are able to try out things which you could never try in the real system.

Just by playing around with the computer model, you would get a much a better idea of how things actually work on the farm. The

COMPREHENSIVE GUIDE TO FARM SOFTWARE

Pigplan	Designed to replace the manual recording systems for a pig breeding herd.	$1400	Apple IIe	48K total Disk
Paddockplan	A crop management program suited to many types of crop.	$1400	Apple IIe	48K total Disk
Dataplan	A database program for general use where data structure and report formats are easily created by the user to suit requirements.	$250	Apple IIe	48K total Disk
Agricalc	A series of templates including budgets and cash flows and specific management tools for individual enterprises.	$250	Apple IIe plus Visicalc	48K total Disk
Agriplan	As above.	$250	Apple IIe plus Multiplan	48K total Disk

computer could run a simulation of several years, but only take minutes to carry out the simulation.

At present, system simulation is used in research to study specific areas of agriculture. One model which simulates the growth and spread of rust in barley crops, can be used to determine the best time to spray the crop for rust control. Another looks at the growth of pasture in Canterbury.

It will be some time before a model is produced which can accurately simulate the whole farm situation, but there is little doubt the day will come when farmers can study the benefits and costs of alternative farming systems using computer simulation models.

Concern at dismissal

Sir — Your publication gives the impression that it seeks to educate in an unbiased manner in the field of microcomputers for schools. Accordingly, we are a little concerned at your light-hearted dismissal (Bits & Bytes, March 1983), of the State Services Commission Report for the Minister of Education in regard to schools computers. Certainly, as published, the "report" provides little assistance to secondary schools and we are arguing with the minister for a full release. (We are not aware of any other suppliers similarly doing this).

However, for your information, microcomputers as a whole were evaluated as a result of our arguing the case that Poly should not be arbitrarily supplied to schools. We maintained, as we still do, that other machines could adequately serve school requirements, at a more competitive price.

That the BMC800 should rate highly in such an evaluation is hardly surprising. With 64K RAM, CP/M compatibility, full ASCII keyboard, high resolution RGB colour graphics screens, 80 cps printer dedicated to each slave, networked by our MX(6) computer (installed in hundreds of New Zealand businesses and teaching institutions), it is a serious contender for both stand-alone school needs and classroom networks. In fact it is selling in both configurations.

Much of the present hardware installed in schools has been purchased prior to the completion of the report to the Government by the Consultative Committee for Computers in Schools and also prior to the hardware evaluation carried out by the State Services Commission on behalf of the Department of Education.

In a number of cases the installed equipment is dated, and it was clear some months ago that the Department had a strong preference for relatively sophisticated equipment capable of colour graphics networking.

For approximately 12 months, our own company has maintained close contact with the department and the needs of the consultative committee so that we were in a position to offer the most appropriate hardware when requested. This policy is consistent with our criticism of other companies which have been hard selling microcomputers to schools when they fall well short of minimum performance as set out by the department. It would therefore seem a little unkind of you to criticise the BMC800 because "it was not an existing microcomputer in schools".

We would encourage you to join our call for the full release of the SSC Report. The survey was carried out at considerable expense to the taxpayer and contains extremely valuable information which will greatly assist schools in assessing relative technical merits of alternative hardware.

The Freedom of Information Act concept seems to be very relevant here. — KEN EAGLE (Marketing manager, Microcomputer Developments Ltd).

BITS & BYTES regrets the omission of the BMC 800 from our series on education networks but full coverage of the BMC will be provided in our July issue.

INVITATION TO REGISTER

Suppliers interested in tendering for a network of 12 microcomputers with shared access to a hard disk, each station able to run CP/M software, please register with:

D McAven
Manager
Computer Resource Centre
Christchurch Polytechnic
PO Box 22095
Christchurch

Personal Computers Galore at 1983 Auckland Microcomputer Exhibition

Wall to wall personal computers is one description given to Auckland's microcomputer event of the year. From hand held models to businesslike desktop machines, personal computers will be the main feature of this year's Microcomputer Exhibition on Saturday, July 2.

This event, the fourth arranged by the New Zealand Microcomputer Club Inc, is designed for the ordinary person to catch up on today's world of computing.

To accommodate the expected crowds on Saturday, July 2 Auckland Showgrounds has been selected as the venue for the 1983 show. C Pavilion has capacity for a 50 percent increase in commercial and hobbyist exhibitors, plus the ability to house at least double last year's crowd of two and a half thousand visitors — all eager to see, use and probably buy, from the widest variety of personal computers, software and books ever assembled in New Zealand under the one roof.

Along with the full range of microcomputer equipment, on display will be many of the practical business and personal uses that have swiftly become the trademark of microcomputers. With today's prices ranging from under $200 to over $10,000 there is sure to be a microcomputer to suit everybody.

The doors open to the public at 9am for eight hours of non-stop activity, including demonstrations, lectures and hands-on experience for everybody. Plus the chance to win a computer.

Exhibitors wil include hobby and business microcomputer clubs, schools and technical institutes, as well as large and small retailers of microcomputer products and literature. All with the emphasis on what is available here and now.

Information on local microcomputer happenings, clubs, user groups, organisations, seminars, courses and camps will be available on the day. Plus the chance to ask questions of the many people who are involved in the microcomputer scene.

The Micro Club will operate a trading table for part of the day and many exhibitors will have products for sale.

Admission will be $1 per person and the Showgrounds carpark will be available at $1 per car.

Some of the exhibitors who will be at the 1983 Microcomputer Exhibition are listed below with brief details on what they will be displaying on the day.

Bits & Bytes **Stand 5**

We'll be at the exhibition to sign up new subscribers, sell back copies and generally listen to any comments or criticisms about the magazine. Come along and say hello.

Computer Training Centre **Stand 42**

Because of the large gap in the market between vendors selling computers and those considering purchase or have just purchased a computer, the Computer Training Centre has recently been established to give people with little or no experience of computers a grounding in how a computer works, how to look after and operate it, and training in the various business packages available.

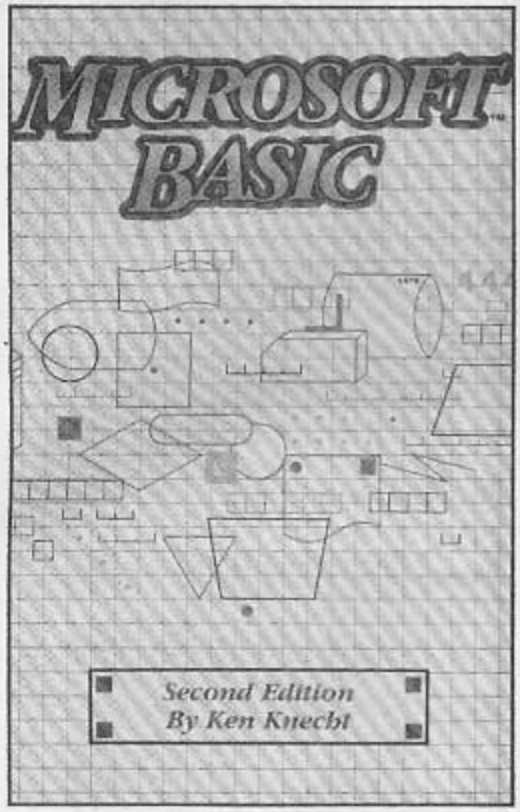
Courses are run on a regular basis, with a maximum of eight people per class.

K'Rd Video and Computer Co., Alpine Computing **Stands 6 and 7**

Stands 6 & 7 will feature personal computers. The Sinclair ZX 81, Spectrum, Commodore Vic 20, Commodore 64 and the BBC computer. Plus full Apple-compatible computers and a range of disk drives and monitors.

The fullest possible selection of software will be available over 100 programs for the VIC 20, Commodore 64, Spectrum and BBC.

The BITS & BYTES Computer Book Club



Save on this fine book!

JUNE ONLY BONUS POINTS SPECIAL

MICROSOFT BASIC (2nd edition) By Ken Knecht

Shows how easy it is to learn to program using this powerful language. A comprehensive tutorial on programming using Microsoft version 5.0 with TRS80/System 80 and other generalised CP/M-based systems as examples. This edition has a new chapter on the Microsoft BASIC compiler.

Save $6.50 on normal retail price by using three of your bonus points. $23.45 compared with the normal $29.95.

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Save $3.50 by using one of your bonus points. $26.45 instead of $29.95.

Note this special price is available only to those with bonus points from previous purchases or purchases with the order. It applies only to orders received by the Bits & Bytes Book Club by July 8, 1983. The book will then cease to be a bonus-points special.

Save $8.20 on this one!

JUNE ONLY BONUS POINTS SPECIAL LIMITED NUMBER OF COPIES ONLY AVAILABLE!

Microprocessors from Chips to Systems By Rodney Zaks

This early, hardback edition of this fine book, a great introduction to the hardware side of computing.

Use five bonus points and it's yours for $14.75. That's a saving of $8.20 on the normal retail price of $22.95.

Note that this special June offer is limited until July 8, 1983, in our hands. Supplies are restricted and books will be sold on a first-come, first-served basis. The offer is open only to those who have, or with the order will have, accumulated at least five Bits & Bytes Book Club bonus points.

Other bonus points specials

From Dits to Bits...
A personality history of the electronic computer
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This book takes the reader behind the scenes at the Moore School at the University of Pennsylvania in the late 1940s. A group of young scientists stuggle to devise a technology that would one day revolutionise the world. This is the story of the people whose imagination and effort gave birth to the computer.

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These special deals are available only to those who have already bought BITS & BYTES books, or who order them from this issue, thus gaining the necessary bonus points.

Excuse Me... What was That?
Anton Braun Quist

A very funny book full of anecdotes about things that should've worked but didn't and the things that did work but for all the wrong reasons. Only the person whose never sworn at his micro will fail to get a grin out of this book.

dilithium press Our price $9.35. **Save 60c and earn a bonus point**

Running Wild: The Next Industrial Revolution
Adam Osborne

Lift your head from the terminal for a few hours' and have a good read of what the electronics/computer revolution may bring about for the world. This is the second industrial revolution. Robotics, bionics.... dream or nightmare?

McG-H Our price $8.95 **You save $1.45 and earn a bonus point**

Books for the buff

Microcomputer Design and Troubleshooting Eugene M. Zumchak
Contains every aspect of microcomputer design from the idea to the working system. Controller functions, the development system, read/write timing, good hardware design, the computer system, hardware testing and troubleshooting and the three basics of software design: documentation, philosophy, and technique.

Howard Sams Our price $30.75 **You save $3.35 and earn three credit points**

Introduction to Word Processing Hal Glatzer
What a word processor is. What it does. How to use one. How to choose one. A word processor is not so likely to generate cash flow, as it is to save time, trim labour, improve efficiency, and productivity, says the author. The "Bits & Bytes" reviewer described it thus: "An ideal introduction to word processing for the home-computer initiate."

Sybex Our price $21.60 **You save $1.15 and earn two bonus points**

Mastering Computers G.G.L. Wright
A good introduction for the initiated, or for use as a text in a computer-appreciation course. Covers the field from the basis of mainframes, through such everyday applications as bar coding to the possibilities of videotex and an electronic money system. Well written in a concise, British style, and well illustrated.

Macmillan Master Series Our price $9.45 **Save 50c**
Plus 1 bonus point

Mastering Computer Programming P.E. Gosling
A complete, self-contained course from Britain for self study at home, or for use in the classroom. In one book, the essential information to learn programming. The language taught is BASIC. The author, a former lecturer in computing, runs a computer services company.

Macmillan Master Series Our price $9.45 **Save 50c**
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Z80 Assembly Language Programming L.A. Leventhal
Comprehensive coverage of the Z80 microprocessor assembly language. Examples illustrate software development concepts and actual assembly language usage. Assemblers and assembler directives are explained. Includes more than 80 sample programming problems. All problems solutions in source code and object code. Each Z80 instruction fully explained.
Our price $33.95 **You save $1.78 and earn three bonus points**

Basic Programming on the BBC Neil and Pat Cryer
You've seen the machine on television, and this is the book prepared to go with the programme. It's designed for the new BBC, and teaches how to write programs, draw and animate pictures and graphics in full colour, design sound effects and program games. Detailed glossary.

Our price $19.25 **You save $1.05 and earn two bonus points**

Your Timex Sinclair 1000 and ZX81 Douglas Hergert. For Sinclair users: Takes you from the very beginning and explains in simple, everyday language how to use your ZX81 to its fullest capabilities. How to connect your TV and cassette recorder and make them work together. Giving commands, writing your own programs for graphics, calculations, games, and more. Ready-to-run programs include a supercalculator; bar graphs for home budgeting; drawing picture on the TV screen. A good book for the new user.

Sybex Our price $11.86 **You save 65c and earn a bonus point**

Software from Prentice Hall

For the IBM PC: Cross Reference Utility (CRF)

Provides a complete listing of variables withing a BASIC program, enabling you to review, analyse, and modify a program to achieve maximum capability from the computer system. This unique utility program helps you to locate and correct typograhical errors, identify frequently used variable, and quickly change variable names.

Our price $56.45 You save $6.29

(Bonus points do not apply to software)

"Paint" — art software for the Atari

Designed for the Atari 800, "Paint" is an easy to use diskette and book allowing users to create dazzling, intricate colour pictures on a screen. Features include one-letter mnemonic commands (like B for brush, E for erase, Z for zoom) which are easily learned at the first sitting. You can create hundreds of different colour/texture combinations. Needs 48K Atari 800 with disk drive, colour TV or monitor, and joystick.

Our price $66.50 You save $7.45

(No bonus points)

MULTIPLOY

Apple Arithmetic Software

By transforming arithmetic problems into an outer-space shoot out. MULTIPLOY has made arithmetic drills irresistable fun. Simply slip the Multiploy diskette into an Apple II, select an operation and difficulty level, and you're under attack.

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Books for the beginner

Program Your Microcomputer in BASIC Peter Gosling
No previous knowledge of computing is assumed. The author says this book is designed to cut in just where the manuals have allowed you to get your new micro up and running. Instructions or groups of instructions are dealt with in activities, giving a complete course in the elements of BASIC.

Macmillan Our price $13.25 **You save 70c and earn one bonus point**

Don't, or How to Care for your Computer Rodney Zaks
An easy, entertaining guide to computer and peripheral preservation. Specific advice for the computer, floppy discs, hard discs, the CRT terminal, the printer, tape units, the computer room, software, and documentation. In the words of "Popular Computing" this book is"...cheap insurance".

Sybex Our price $22.75 **Save $1.20 and earn two bonus points**

BASIC Exercises for the Atari J.P. Lamoitier
A practical and entertaining way to learn programming with Atari BASIC. Through step-by-step examples you learn the fine points of the language and how to write your own programs. This is what "Interface Age" said: "This excellent book . . . teaches BASIC without talking down to the reader." The exercises run on the Atari 400, Atari 800, and the new 1200XL.

Sybex Our price $21.80. **You save $1.14 and earn two bonus points**

Mastering VisiCalc Douglas Hergert
Written both for newcomers to the spreedsheet program and for those who are aready using it. Shows how to set up VisiCalc spreadsheets for finance, buisness and numerical applications; how to change the paramaters; how to create the formulas; how to use the DIF file function. A complete guice.

Sybex Our price $19.90. **You save $1.05 and earn two bonus points**

Parlez-vous BASIC R.J. Campbell and M.R. Ellis
A textbook for teaching programming on the Commodore PET. A useful source for the teacher. Written by two teachers at Palmerston North Boys' High. Indexed, and with cartoons, diagrams, and charts.

Phase 3 Electronics Our price $8.50 **You save 50c and earn 1 bonus point**

Doing Business with VisiCalc Stanley R. Trost
Assumes an introductory-level understanding of VisiCalc. Beyond that it is a quick and easy guide. It has more than 50 planning and forecasting applications ranging from financial statements to master budgets, and pricing models to investment strategies. Each application is described in detail and a complete program for setting up the application in VisiCalc is noted.

Sybex Our price $19.90 **You save $1.05 and earn two bonus points**

Doing Business with Pascal Richard and Douglas Hergert
Gives the building blocks for writing complete business programs in Pascal. Learn how to use UCSD Pascal and its extensions, modular programming, and file management techniques to design efficient, interactive programs for your business tasks. Includes listings for programs such as vendor performance analysis, accounts receivable ageing analysis, financial ratios, sales analysis.

Sybex Our price $28.45. **You save $1.50 and earn three credit points**

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Executive Planning with BASIC X.T. Bui

A collection of interactive, oriented business programs. They can be used in their existing form or as tools for management and planning decisions. Finding breakeven point, linear programming, inventory management, critical path analysis, moving averages, linear regression, financial ratio analysis, portfolio management . . . these are some of the topics covered.

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How to Use SuperCalc Deborah and Jerry Willis and Merl Miller

A guide to the applications and implementation of spreadsheet programs in general, and to SuperCalc specifically. Simple language, down-to-earth directions. Tells you how to organise, arrange, and manipulate your data, and is also a reference manual.

dilithium Press Our price $37.95 **You save $2 and earn 3 bonus points**

Some Common BASIC Programs: Atari Edition Lon Poole et al

Seventy-six short programs to key into your Atari 400 or 800, giving you a powerful collection of financial, statistical, and maths programs. Each program is complete with source listing, documentation, and sample execution.

Osborne/McGraw-Hill Our price $29.90 **You save $1.60 and earn three bonus points**

PET Fun and Games Jeffries and Fisher

Selected Cursor Programs

More than 30 games and puzzles, selected from more than three years issues of "Cursor" magazine. Will run on any model Commodore PET or CBM. The games include Zap, Shark, Demon, Maze, Dungeon, Yahtzee, Mad. The puzzles include Hanoi, Box, and Mind.

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Applesoft BASIC A Teach-Yourself Introduction Barrie M. Peake

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7

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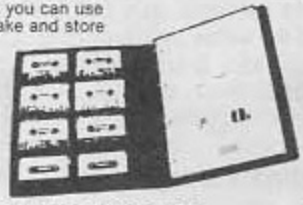

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NORVUE 1035

Mike Wall is lecturer in Computer Education at ChCh Teachers College. The views expressed are his and should not be interpreted as Educational Department policy.

Primary Problems

The cries of "despair and confusion" emanating from the nation's secondary schools evidently aren't loud enough. Primary schools want to get into computers.

I'm sure that primary teachers really believe that the "despair and confusion" stuff was invented by the PPTA just to bludgeon the Education Department. Computers couldn't possibly cause anything but rejoicing. . . . could they?

Hope springs eternal. Machines which are supposedly so cold and logical do seem to generate great waves of wishful thinking.

Of course, the machines themselves are touted as the solution for whatever problem you might have. 1982 was the year of the computer. They are the latest thing; they are "up-market"; they put you one step ahead. How?

Most secondary schools taught some kind of computing long before the era of the micro, so they had a ready-made need. The new-fangled subjects, computer awareness and computer studies then grew up round the new machine. This isn't to say, however, that no secondary school bought one because the school down the road had one: or that a tiny group of individual teachers didn't suddenly develop a hankering to play with one!

Whatever the motives, the machines are now part of the scene and from an initially narrow base (programming) the use of computers is slowly and painfully worming its way into other areas of the school.

So what about it, you primary teachers? Why do you want a computer?

Some honest primary souls have actually been heard to say that they believe computers are wonderful things, but that they really don't know what to do with it when (not if) they get it.

It's easy to rubbish that sort of attitude, but in some ways, there is no real alternative. Primary schools have had no contact with computers of any kind before. Probably only a handful of primary teachers have ever used one or have had any formal computer training. What knowledge do they have to go on, apart from a gut feeling that all the fuss must be worth taking notice of?

Much of what has happened in secondary schools has been caused by the presence of computers and there is also no denying that in the big wide world beyond the classroom, computer chips have provided answers before people even realised there were needs. ("Gosh, I wish I had a television game where I could shoot down little men from space all day!")

Cynical souls may mutter about the tail wagging the dog, but the fact remains that the best way to learn what a computer can and can't do, is to use one.

However, it's not all groping in the dark. Experienced users can suggest possible applications before any purchase is made and we have overseas experience to call on. Snags abound. The experienced primary school users are unlikely to be representative of primary school teachers and, if secondary schools are anything to go by, overseas experience gets rapidly written off as useless.

"Americans have too much money, the Brits are obsessed with electronics and the Aussies have never been able to show us anything worth while before, so what makes you think they can start now?" — from "Quotable Quotes in NZ Education."

So what are the primary schools going to do?

My answer, in short, is use computers as aids to teaching. Teaching directly about computers is best handled at secondary level and traditional computer programming is a tin of fish hooks at the best of times.

Don't worry; primary schools aren't being deprived of any perks. By using computers, primary pupils will learn about screens, disks and keyboards without formal instruction. They will also discover that computers require instructions, that they can store information and that they can do certain things very fast. Isn't this the best way to learn anyway?

As for the teaching of programming: opinions range from those who say DON'T to those who believe that a keen and able teacher can benefit pupils by teaching them almost anything. (The example given was Greek.) I feel that "teaching a computer" can be a very creative activity and the LOGO language is the greatest thing that happened to kids of all ages since the Muppets. Telling a turtle how to draw shapes is really computer programming you do when you aren't doing computer programming. LOGO at present doesn't run on all computers, but before too long, I think it will become a standard software item. Roll on the day!

So here we are in our primary school with our computer, and we are ready to use it as an "aid to teaching". This means individual drill and practice (remedial if desired), whole class or small group simulation exercises, using the computer as a clever overhead projector etc. etc. (In a future column, I will examine these broad categories in detail.)

But beware of the pitfalls.

Computers are, of course, marvellous things, and in the right hands they are very potent educational tools. But newcomers will always seriously underestimate the amount of time and sweat needed to make them truly effective.

Many of New Zealand's secondary schools have had computers for three years or so and during that time, thousands of person-hours have gurgled into making them effective teacing tools. An outsider, unacquainted with the medium, could look at what has been done and wonder where the time actually went.

After all don't you just bring a computer into your class, turn it on and watch it do its stuff?

EDUCATION

Without wishing to dampen enthusiasm, it is worth examining what has to happen before a computer is let loose on a class;

1. The teacher has to know how to operate the computer.
2. The teacher has got to find a suitable computer program to use.
3. The teacher has got to know thoroughly how the program works.
4. The teacher has got to provide a lead-in to the program, pupil resources to accompany the program, and effectively tie things together at the end.

This is where those thousands of hours have disappeared to. Short cuts are guaranteed to cause at best a mediocre lesson and at worst a disaster.

There is definitely a place for the computer in primary schools but progress, assuming that official support stays non-existent, will inevitably be slow. Get into computers by all means, but leave your rose-tinted spectacles back in the computer shop.

I've heard that a group of kindergarten teachers may be coming in.

HARDWARE REVIEW

From page 14

which could more accurately be described as software for preparation of numerical control machine programs, for control of numerical control machines, and for civil engineering calculations.

This software, still to be fully converted from Italian, demonstrated well using the graphics features of the M20. Brian described how the package could do the job of special numerical control machine computer systems which can cost three times the price of the M20.

Altogether, the Olivetti M20 is a useful microcomputer offering good value. Prospective purchasers should examine their disk space requirements carefully before choosing a configuration.

Review unit from:
Armstrong & Springhall Ltd
P.O. Box 645,
Christchurch.

Reptile ramble

By GORDON FINDLAY

This month for a change I have a program for you. It is a simple game, with one or two interesting programming features. The game was written for youngsters who find the "real" computer games too fast. It is based on a game I have seen on (dare I say it) an Apple.

Playing the game is simplicity itself. The player controls a "snake" which moves around the screen within four walls. The snake is hungry, so needs to be steered towards food, represented by hash (!) signs (##).

The player scores points for each food block reached. Some of these give "mystery" points — up to 200. The game is over whenever the snake runs into its trail, or a wall. Because all the food blocks vanish when one is eaten, to reappear elsewhere, gaps open in the track. A rudimentary "top score" feature is allowed.

One of the programming features is the use of PEEK instructions to check to see if a key is being pressed. As far as the TRS/SYSTEM-80 is concerned, the keyboard is a block of memory. One of these locations is 14400 (decimal). This location corresponds to the four arrow keys, and **ENTER** (or New Line). The value in this location is given by this table:

key being pressed:	value (decimal):
none	0
left	32
right	64
up	8
down	16
enter	1

Combinations of keys can also be detected, e.g. if the up and left arrows are both being pressed, this location will return 40 (32 + 8). The space, break and clear keys also return values in this location. but they aren't used in the program.

Also used in the program are functions for determining which **PRINT** @ location corresponds to given graphics co-ordinates, and the use of **PEEK** to read the screen. The video display is also a block of memory — from 15360 to 16383. The memory location for a screen location is 15360 + the **PRINT** @ location. The contents of the screen can be found by peeking at the corresponding location.

The program as listed here is written for disk **BASIC**. Conversion for tape, or other memory sizes is easy enough. For non-disk you will need to convert all the hex numbers (e.g. &H3840) to decimal, change the **DEFUSR** statement to the two pokes used by level 2, and remove the two **DEF FN** statements by writing their expressions in full whenever used. The **CMD"T"** can be removed. If you run into trouble, drop me a line. My address is 87 Somerfield Street, Christchurch 2, and so far I have replied to all the letters I have received. A stamped envelope would help ensure that this record is maintained!

I find this game is a real hit with young children, and some not so young! There are two ways to bend the rules which are not prevented by the program. Because the characters do not fill the bottom two pixels of a screen location, the 'snake' can 'eat' food without quite reaching it. This doesn't seem to worry players. The other 'fiddle' I will leave for you to find, and explain.

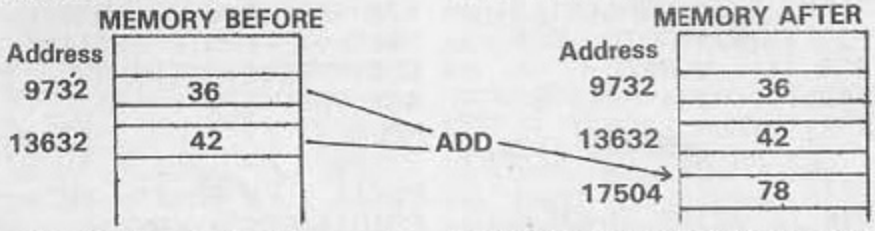
```
10 ' SNAKE:  a trainer
video game.
20 ' by G. A. Findlay,

30 ' 87 Somerfield
Street,
40 ' Christchurch,  2.
50 '
69 ' bypass title if
<ENTER> or arrow key
pressed:
70 IF PEEK(&H3840) <> 0
THEN  GOTO  90
80 CLS:  PRINT @470,
"Ssss N A K E!": FOR I
= 1  TO  100:
```

```
SET(RND(127), RND(47)):
NEXT
89 'disable interrupts,
reserve memory and poke
sound routine.
90 CMD"T": POKE 16561,
225: POKE 16562, 255:
CLEAR 200: RANDOM:
RESTORE
100 AD = 65506: DEFUSR1
= &HFFE2
110 AD = AD - 65536:
FOR I = AD TO AD + 28:
READ DT: POKE  I, DT:
NEXT
120 DIM PS(10) 'storage
for screen positions of
'food'
130 DEF FN SR(X, Y) =
INT(X/2) + INT(Y/3) *
64
140 DEF FN SC(X, Y) =
PEEK(&H3C00 + INT(X/2)
+ INT(Y/3) * 64)
150 SR = 0: NBLKS = 5
159 'make a noise
160 XX = USR1(3900) +
USR1(5677) + USR1(3900)
+ USR1(4463)
170 PRINT@ 960, "PRESS
ANY KEY  TO  BEGIN:
";CHR$(31);
180 IF INKEY$ = ""
THEN 180
189 ' draw walls
190 CLS: FOR  I% = 0
TO  127: SET(I%, 0):
SET(I%, 41): NEXT
195 ' BK$ is a food
block,  BL$ a blank the
same size
200 BK$ = STRING$(4,
"#"): BL$ =-STRING$(4,
32)
210 FOR  I% = 0  TO
41: SET(0, I%):
SET(127, I%): NEXT
220 GOSUB 390
230 GOSUB 480
240 X = 63: Y = 20:
SET(X, Y)
250 J = 64
259 ' read keyboard
260 JJ = PEEK(&H3840)
269 ' if no key
pressed,  use last key
270 IF JJ = 0  THEN  JJ
= J
280 J = JJ
289 ' extend snake
290 IF JJ = 8  THEN  Y
= Y - 1 ELSE IF JJ = 16
THEN  Y = Y + 1 ELSE IF
JJ = 32  THEN  X = X -
1 ELSE IF JJ = 64  THEN
X = X + 1 ELSE GOTO
260
300 AA = FN SC(X, Y)
309 ' see if hit food
310 IF AA =  35  THEN
GOSUB 470: GOSUB 400:
GOSUB 480: SET(X, Y):
GOTO  260
319 'see if hit
wall/snake
320 IF POINT(X, Y) = 0
THEN  XX = USR1(511):
SET(X, Y): GOTO  260
330 XX = USR1( -
24321): CLS: PRINT@
256, "YOUR SCORE:
";SR: PRINT' TOP SCORE:
";TS
340 IF SR>TS  THEN
PRINT"NEW  TOP SCORE!":
XX = USR1(7725) +
USR1(7715) + USR1(7725)
+ USR1(7715) +
USR1(7725): TS = SR:
INPUT"WHAT IS YOUR
NAME";NTS$: NTS$ =
LEFT$(NTS$ +
STRING$(15, 32), 15):
350 PRINT@ 960, "PRESS
SPACE FOR  ANOTHER
GAME,  NEWLINE  TO
STOP";
360 XX$ = INKEY$: IF
XX$ = "" THEN  360 ELSE
IF XX$ = " ' THEN  150
ELSE IF XX$  =
CHR$(13)  THEN  CMD"R":
END ELSE GOTO  360
380 END
390 PRINT@ 896, "YOUR
SCORE:  ";SR;"
TOP SCORE:  ";TS;" BY
";NTS$;CHR$(31);:
RETURN
400 XX = USR1(7725) +
USR1(4463) +
USR1(7740)
410 IF RND(4) <> 1
THEN  SR = SR + 10:
GOSUB 390: GOTO  440
420 PRINT@ 980,
"MYSTERY POINTS!";
430 FOR  I = 1  TO
RND(20): SR = SR + 10:
PRINT@ 921,
SR;CHR$(30);: XX =
USR1(&H3FF): FOR  II =
1  TO  50: NEXT: NEXT:
FOR  I = 1  TO  300:
NEXT: GOSUB 390
439 ' doing too well  -
make 'food' smaller
440 IF SR>500  THEN
BK$ = STRING$(2, "#"):
BL$ = STRING$(2, 32)
450 IF SCORE >1000
THEN  NBLCKS = 3
460 RETURN
470 FOR  I = 1  TO
NBLCKS: PRINT@ PS(I),
BL$;: NEXT: RETURN
480 FOR  I = 1  TO
NBLCKS: XX = RND(117) +
2: YY = RND(33) + 3:
PS(I) = FN SR(XX, YY):
PRINT@ PS(I), BK$;:
NEXT I
490 RETURN
499 ' data for sound
routine
500 DATA 205, 127, 10,
62, 1, 14, 0, 237, 91,
61, 64, 69, 47, 230, 3,
179, 211, 255, 13, 40,
4, 16, 246, 24, 242,
37, 32, 241, 201
```

In the Belly of the Beast: The CPU

By GERRIT BAHLMAN

We have talked about the structure of memory and the way in which things stored in a computer's memory are able to be found. In this article we will take this a little further. Let us say that we have a piece of information stored at an address in memory which we want to add to another piece of information which is also stored in memory. This answer we then want to place somewhere else and remember it also. What we want the computer to do might look like figure 1.



So, in terms of the numeric example, the computer is to get the value in the memory location at 9732, transfer it to its **central processing unit.** Also get the value at memory location 13632, transfer that to the CPU do the arithmetic using the arithmetic programs it has available (arithmetic unit) then take the result back to memory and store that at memory location 17504.

You can see that even a simple job like adding two numbers actually involves a great deal of work. While I can't show you in detail here it's worth remembering that a computer's CPU runs special little programs called micro code which programmers normally don't even worry about unless they are interested in CPU design. If you were to delve that deeply you would realise just how complex something like addition really is.

When we program in a high-level language we do not normally get involved in grubby details like the addresses of memories in which values are stored, we just use names for the addresses and the computer sorts out the memory locations we mean. The place where the computer keeps a track of the names and the addresses is called the symbol table. But enough of that.

In a high-level language such as Fortran the addition might look like this: X=Y+Z

In fact the same sentence would also make sense in BASIC and a number of other languages. In Pascal, X:=Y+Z; would work. In LOGO, MAKE "X SUM :Y :Z would do the trick. In COBOL, we would use: ADD Y, Z GIVING X

Obviously there are a number of ways of saying the same thing in high-level languages. But when you are dealing with a particular machine and you are writing in that machine's language you must be very specific. You couldn't write a machine program which addressed memory loctions that didn't exist for example. Well, I suppose you could, but the results wouldn't be very interesting.

At any rate each of the three variables, X,Y,Z, is assigned a memory location which is stored in the symbol table. In terms of our example Y might be assigned the memory location 9732, Z might be given 13632, and X 17504. The contents of locations 9732 and 13632 are to be added and the result is to be put into location 17504.

The important thing to notice about all this is that it is possible to get confused about what the names X,Y,Z and the numbers are doing. They are just labels for their respective locations and they are **not** the values inside them. If you have understood that you will have made an important breakthrough in understanding the difference between a variable's **name** and its **value.**

So each memory location has two things associated with it: its name or address, and its value — the information which is kept there. When we use a name like Z in a high-level language or indeed in a low-level language, we are talking about the **symbolic address** of some quantity which is saved in memory.

As far as central processing units are concerned we have to know how they like information to be presented to them. Do they want pieces of information from memory brought to them one at a time, two at a time or how? What sorts of things can the CPU handle?

In an effort to understand this I am going to talk about CPU's as if there were four distinctly different sorts of ways in which computers operate with information. You have to remember that in fact most machines let you do a mixture of all four so that it is often more complicated than it first appears.

The CPU is capable of a number of elementary operations such as addition, subtraction, multiplication, and division. Most arithmetic operations use two numbers at the the same time. For example, you have to have six times something before you can multiply. As well as that you must have somewhere to put the answer. In the old-fashioned desk calculator they used an **accumulator.** Modern calculators have several accumulators or memories. Accumulators are also called **registers.** In a simple calculator the number typed in on the keyboard might have been added to what was already in the accumulator leaving the answer in the accumulator. So the operation of addition got its two starting numbers from the accumulator and from the keyboard it then put its answer back into the accumulator.

With multiplication the two numbers it needed would probably be typed in from the keyboard and the answer would appear on the accumulator.

In some ways the computer works like a desk calculator with the memory doing the job of the keyboard and the CPU having an accumulator or more than one. The memory supplies the numbers that are to be operated on and the answers on the way through are kept in the accumulators.

In the next article we will use these ideas to separate out the different sort of CPUs.

Basic BASIC part 8

continuing a series on BASIC for beginners

By GORDON FINDLAY

Tricks with arrays

Last month we dealt with arrays. This month, let's try some further explorations in this tangled area, and a few useful tricks.

A typical application for an array is to store lists of information. As a slightly different example from usual, let's consider how we could store the information needed for a diet management program. We need to store a list of foods, and with each, it's calorie value.

The names of the various foods will obviously be strings, such as "standard egg", "bananas", or whatever. The calorific value will be a number, such as 158, or 78, which are the values for the foods I just listed. We need to agree from the start on the units used. All of my work will be in terms of "kcal per 100s" for calorie content, and grams for weights.

Here is an obvious application for two arrays — one containing the foods as strings, and the other the calorie counts. The first will be a string array, the second numeric. Almost all machines nowadays support string arrays, but Sinclair owners will need to modify this. String arrays are declared just like numeric ones, so we need a dimension statement, such as

```
10 DIM FD$(100),CC(100)
```

The two arrays will work in tandem — each FD$ member will be a food, and its corresponding calorie figure will be the SAME NUMBERED element of CC.

First, we have to get the information into the arrays. No sense in typing it all in through the keyboard every time the program is run — put it all in DATA statements, and READ them. The statement to read one FD$, CC pair is:

```
30 READ FD$(I),CC(I)
```

This obviously needs to be in a loop. Two possibilities here for you to think about: we could count the number of foods, and use a FOR loop, or we could avoid counting by adding a special "food" to the end of our list as a signal that we have finished — say "FINISHED"! Reading this would indicate that there were no more foods. The first approach is the easier to program; the second the easier to add foods to when you wish to expand. In the second case it will be useful to count the foods as they are read, so we know how many we have got for later use in the program.

The first way looks like this:

```
10 DIM FD$(100),CC(100)
20 FOR I=1 TO 100
30 READ FD$(I),CC(I)
40 NEXT I
```

The second approach could be done this way:

```
10 DIM FD$(100),CC(100)
20 I=1
30 READ FD$(I),CC(I)
40 IF FD$(I)="FINISHED" THEN GOTO 70
50 I=I+1
60 GOTO 20
70 NO=I-1
80 REM rest of the program here: NO is the number of foods.
```

Notice line 80 is needed to avoid counting "FINISHED" as a food. The second approach makes adding more foods simply a matter of inserting more data before the "FINISHED". If you adopt the first approach, you need to check the program carefully to change the number of foods everywhere you have used it. The use of a 'rogue value' such as "FINISHED" avoids this. Notice that the READ statement forces you to give a (dummy) calorie value for the last data item.

About the data statements to go with these reads. To put a string in a data statement it must usually be enclosed in quotes. The reason for this is so that commas and other punctuation can be included in the data strings. Sample data statements:

```
90 DATA "APPLES",46,"APRICOTS, DRIED",182,"APRICOTS, RAW",28
100 DATA "BANANAS",78,"BLACKBERRIES",28,"BREAD, WHITE",253
```

How do we go about retrieving this information? How could we find out the calorie content of, say an egg? Let's allow the user to type in the name of a food, and get given its value. The first bit is easy:

```
500 PRINT"TYPE NAME OF FOOD REQUIRED";
510 INPUT RQ$
```

Looking something up basically means comparing the required

strings with each member of the array in turn, and stopping when we get a match. One neat way is to set up a FOR loop, and jump out of the loop when a match is found. If we set all the way through the loop without jumping out, then we were unable to find the required information, and should say so. If we do jump out, the index of the loop will tell us which member matched; NO is the number of foods included in the program:

```
520 FOR I=1 TO NO
530 IF FD$(I)=RQ$ THEN GOTO 600
540 NEXT I
550 REM HAVEN'T JUMPED, SO COULDN'T FIND IT
560 PRINT"ERROR: CANNOT FIND";RQ$
570 PRINT "TRY ANOTHER"
580 GOTO 500
590 REM GET TO LINE 600 BY JUMPING FROM LINE 530
600 PRINT RQ$; "IS FOOD NUMBER";I
610 PRINT "IT'S CALORIFIC VALUE IS";CC(I); "KCAL/100G"
620 GOTO 500
```

Try to predict what the exact output will be for an input of "BANANAS" with the data above.

Certainly you will be able to think of improvements to this bit of program. For a start, after reading all the foods in, we should sort them into alphabetical order. If we did so, we could stop comparing once we had gone past the food we were searching for: if we wanted "KUMARA", and we hadn't found it by the time we found "LENTILS" we would know that the search was unsuccesful. This would speed things up considerably, at the expense of more difficult programming.

One or two other things to notice. TRS/System-80 owners will need to CLEAR a substantial amount of string space when using string arrays. Many BASICs need to stop every so often and clean up their work area (this is called "garbage collection") — and the program may seem to "hang". Don't be alarmed if it suddenly seems that your computer has gone out to lunch without you!

This approach has one inherent weakness: if the user gives a different wording — say "mashed potatoes" instead of "potatoes, mashed" — the program won't be able to find the food. Of course,

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A guide to the galaxy of computer jargon

What are bits and bytes and are they as nasty as they sound? These and many other examples of computer jargon will be explained in this section for those of you still speaking English. It's our guide to computerese or to use our first word of jargon, our user-friendly section. But don't worry, its not necessary to know all these terms off by heart or to understand them all to be able to use a computer. And jargon that remains confusing will become clearer by reading other articles in BITS & BYTES, books and any hands-on experience (another piece of jargon that simply means using a computer) you obtain.

What does a microcomputer do?

The microcomputer is capable of receiving information, processing it, storing the results or sending them somewhere else. All this information is called data and it comprises numbers, letters and special symbols which can be read by humans. Although the data is accepted and output by the computer in English-like form, inside it is a different story — it must be held in the form of an electronic code. This code is called binary — a system of numbering which uses only 0s and 1s. Thus in most micros each character, number or symbol is represented by eight binary digits or bits as they are called ranging from 00000000 to 11111111. For example the character 'A' is represented inside the computer as 0/00000/.

This group of eight bits is called a byte and to make it easier for people who have to deal with them all the time a number system called hex was invented. The hex equivalent of a byte is obtained by giving each half, or four bits, a single character code (0-9, A-F): 0=0000, 1=0001, 2=0010, 3=0011, 4=0100, 5=0101, 6=0110, 7=0111, 8=1000, 9=1001, A=1010, B=1011, C=1100, D=1101, E=1110, F=1111. Therefore the above example of 'A' is 41 in hex. The machine detects all these 0s and 1s by recognising different voltage levels.

The computer processes data by reshuffling, performing arithmetic on, or by comparing it with other data. It's the latter function that gives a computer its apparent "intelligence" — the ability to make decisions and to act upon them. It has to be given a set of rules in order to do this. The rules are called programs and while they can be input in binary or hex (also called machine code programming), the usual method is to have a special program (called a compiler or interpreter) which translates English or near-English commands into the machine code the computer can understand. These near-English

commands come in a variety of forms called programming languages. The nearer the programming language is to English the faster and easier it is to write programs but the time it takes the computer to execute (carry out the programs instructions) tends to be slower.

The most common microcomputer language is BASIC (which stands for Beginners All-purpose Symbolic Instruction Code). Other examples of programming languages are Pascal and COBOL. Programs written in a programming language are typed in at a keyboard to be coded and stored as bytes in a computer's memory.

To execute or run such a program the computer uses an interpreter which picks up each English-like instruction, translates it into machine code and then feeds it into the processor (see CPU below) for execution. It has to do this each time the same instruction has to be executed.

A faster method is to use a compiler. This translates the entire program at once after it has been completely typed in. The translated (machine code) version can then be executed and it will run at much higher speeds than interpreted programs.

Two strange words you will hear in connection with BASIC are PEEK and POKE. They give the programmer acccess to the memory of the machine. It's possible to read (PEEK) the contents of a byte in the computer and to modify a byte (POKE).

That covers the software — the programs needed to make a microcomputer work.

What about the hardware — the physical components of a microcomputer and associated peripherals which collectively are called a system.

At the heart of a microcomputer system is the central processing unit (CPU), a single microprocessor chip with supporting devices such as buffers, which "amplify" the CPU's signals for use by other components in the system. The packaged chips are either soldered directly to a printed circuit board (PCB) or are mounted in sockets.

In some microcomputers, the entire system is mounted on a single, large, PCB; in others a bus system is used, comprising a long PCB holding a number of interconnected sockets. Plugged into these are several smaller PCBs, each with a specific function — for instance, one car would hold the CPU and its support chips. The most widely-used bus system is called the S100.

The CPU needs memory in which to keep programs and data. Microcomputers generally have two types of memory, RAM (Random Access Memory) and ROM (Read Only Memory). The CPU can read information stored in RAM — and also put information into RAM.

The contents of RAM are lost when the power is switched off, whereas ROM retains its contents permanently. Not surprisingly, manufacturers often store interpreters and the like in ROM. The CPU can only read the ROM's contents and cannot alter them in any way. You can buy special ROMs called PROMs (Programmable ROMs) and EPROMs (Eraseable PROMs) which can be programmed using a special device; EPROMs can be erased using ultra violet light.

Because RAM loses its contents when power is switched off, cassettes and floppy disks are used to save programs and data for later use. Audio-type tape recorders are often used by converting data to a series of audio tones and recording them; later the computer can listen to these same tones and re-convert them into data. Various methods are used for this, so a cassette recorded by one make of computer won't necessarily work on another make. It takes a long time to record and play back information and it's difficult to locate one specific item among a whole mass of information on a cassette; therefore, to overcome these problems, floppy disks are used on more sophisticated systems.

A floppy disk is made of thin plastic, coated with a magnetic recording surface rather like that used on tape. The disk, in its protective envelope, is placed in a disk drive which rotates and moves a read/write head across the disk's surface. The disk is divided into concentric rings called tracks, each of which is in turn subdivided into sectors. Using a program called a disk operating system, the computer keeps track of exactly where information is on the disk and it can get to any item of data by

moving the head to the appropriate track and then waiting for the right sector to come round.

Hard disk systems are also available for micro-computers; they store more information than floppy disks, are more reliable and information can be transferred to and from them much more quickly.

You, the user, must be able to communicate with the computer and the generally accepted medium for this is the visual display unit (VDU), which looks like a TV screen with a typewriter-style keyboard; sometimes these are built into the system, sometimes they're separate. If you want a written record (hard copy) of the computer's output, you'll need a printer.

The computer can send out and receive information in two forms — parallel and serial. Parallel input/output (I/O) requires a series of wires to connect the computer to another device, such as a printer, and it sends out data a byte at a time, with a separate wire carrying each bit. Serial I/O involves sending data one bit at a time along a single piece of wire, with extra bits added to tell the receiving device when a byte is about to start and when it has finished. The speed that data is transmitted is referred to as the baud rate and, very roughly, the baud rate divided by ten equals the number of bytes being sent per second.

To ensure that both receiver and transmitter link up without any electrical horrors, standards exist for serial interfaces; the most common is RS232 while, for parallel interfaces to printers, the Centronics standard is popular.

The speed of a printer is measured by how many characters per second (CPS) it prints.

Finally, a modem connects a computer, via a serial interface, to the telephone system allowing two computers with modems to exchange information. A modem must be wired into the telephone system; instead you could use an acoustic coupler, which has two rubber cups into which the handset fits, and which has no electrical connection with the phone system.

VIC 20 winner selected

— *from over 600 entries*

David Perry, an Engineering Draftsman from Bucklands Beach, Auckland sent in the most outstanding entry in the "What I could do with a VIC 20 Home Computer" competition.

David, an avid reader of Bits & Bytes was overwhelmed to say the least when advised by Commodore Computer that he had won 1st prize. His entry caught the judges eye by its presentation of eight uses his family, including his two children, Andrew 12 and Beth 10, would use it for.

In presenting the prize to David, Graham Truman of Commodore Computer said, "the standard of entrants was very high and it was not easy to choose from over 600 entries". Patrick Dunphy from Supatech, David's local Commodore Dealer, said that he had a lot of people come into his shop because of the contest.

David, who has been considering buying a computer when finance permitted, is now the owner of a Commodore VIC 20 and Datasette, a joystick, three books on programming and using the VIC 20 and plenty of software, including a set of six cassettes of Home and Business programs and several cartridges and cassette games.

The runners up each won a computer book courtesy of Bits & Bytes and they are:

Graham Hawkes
66 Wellpark Avenue
Westmere
AUCKLAND 2.

James Melville
19A Bellview Terrace
CHRISTCHURCH 8.

Mrs Kathy Rodeka
73 Conclusion Street
Porirua
WELLINGTON.

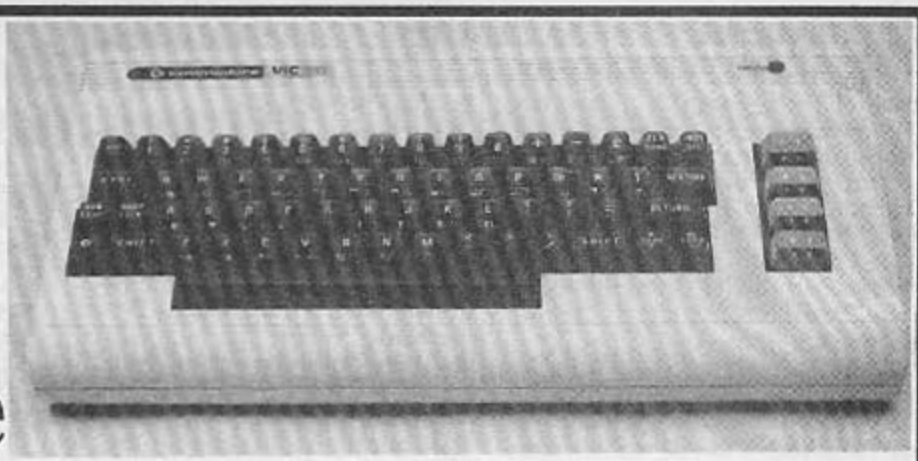
Tony Sargent
26 Balgay Street
CHRISTCHURCH 4.

The Wells Family
90 Surrey Road
Springvale
WANGANUI.

Andrew Young
Evergreen
Pakowhai Road
RD 3
NAPIER.

Bits & Bytes would like to thank all the readers who sent in entries to this competition.

Graham Truman (right), of Commodore Computer, congratulates David Perry, while Patrick Dunphy, from Supatech, prepares to hand over the prize.



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9. All colours directly controllable from the keyboard.

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11. Full set of upper and lower case characters.

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15. Automatic repeat on cursor function keys.

16. User-definable input/output port.

17. Machine bus port for memory expansion and ROM software.

18. Standard interfaces for hardware peripherals.

19. VIC 20 is truly expandable into a highly sophisticated computer system with a comprehensive list of accessories (see panel below).

20. Full range of software for home, education, business and entertainment on disk, cassette and cartridge.

21. Books, manuals and learning aids from Teach Yourself Basic to the VIC programmers' reference guide (a must for advanced programmers).

22. National dealer network providing full service and support to VIC owners.

23. Expertise and experience — Commodore are world leaders in microcomputer and silicon chip technology.

24. Commodore is the leading supplier of micro-computers in New Zealand to business, schools, industry and the home.

25. VIC 20 is the best-selling colour home computer in the world.

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The bad news and the good

By PIP FORER

One of my themes in assessing the BBC computer has always been that it is technically an outstanding machine, but, and the but is significant, it is memory-bound for serious applications. Without means of adding extra memory it resembles a Ferrari in a parking lot: it looks good but it is doomed to frustrate rather than please until someone lets it out on the open road. For the BBC this open road is additional memory, either internal or external. At the slower end it can be disk drives. Alternatively it can be paged memory (accessed by the 1Mhz bus) or, best of all, a second processor with its own RAM. These options free the machine to fulfill its undoubted potential.

The same can be said to be true in the software field for many users. For the businessman or educationist the computer is a machine for solving immediate problems more than a tool to enjoy programming on. Such users want software to solve their problems. Until recently the software base for the BBC machine was hard to assess and again was small, but with potential to grow quickly.

The theme of this column and the next month's is concerned with one issue that covers both of the concerns above. That issue is product maturity. Undoubtedly the BBC computer deserves a 1982 nomination for "most promising newcomer". The question now is the extent to which it is maturing into a rounded system capable of exploiting its own potential.

The bad news . . .

One of the national pastimes in Britain has long been hunt-the-Beeb. Visiting a BBC dealer is often like visiting Monty Python's cheese shop . . . no cheese in stock, not a whiff of cheese for weeks but yes, we do sell cheese. That is the surface impression.

What it disguises of course is high demand. The backlogs on machines have reduced from the early days. However, promised deliveries of vital add-ons are still not appearing. In April, disk interfaces were still hard to get; second processors were still not available.

One has to feel some sympathy for Acorn . . . but not too much. They have faced enormous growth problems. Expecting to sell 12,000 machines in their first year they have sold more than 80,000 (and could have sold so many more with suitable supplies).

Acorn's growth pains have had considerable impact on the consumer. Early purchasers of BBC computers faced months of waiting for delivery. Then many found that their operating system ROMs were faulty and a great debate arose over who should foot the cost of rectifying this. Then as users sought to augment their systems they found that promised add-ons were arriving way behind the schedule and way ahead of price. For a machine any less worthy and backed by a lesser name than the BBC such a track record would have surely spelt disaster. In England it is beginning to reflect in a certain

Prime numbers on the BBC

An Auckland BBC user, O. Ormrod, has questioned a statement by Pip Forer in his BBC column. Mr Ormrod writes: "What's this nonsense about the BBC's not being able to calculate the thousandth prime number?"

He supplies the print-out reproduced here, and says it beats the IBM by 19 seconds.

Pip Forer replies:

Fans of prime numbers should be grateful to Mr Ormrod for his listing, and fans of the BBC computer for his championing of its cause. However, no-one has said the BBC cannot calculate the first 1000 prime numbers (or more within the bounds of its numeric precision). The BBC column in the April issue simply said that the BBC could not handle the memory requirements of the "Byte" benchmarking program. The essence of benchmarking is that you use the *identical* program on each machine. These programs may not be optimal ways of attaining an end. The aim is to test the hardware/language combination, not the quality of the software. The "Byte" benchmark did not use integer arrays (which saves space and time) and did declare a 7000 element array. Hence to be honest I had to do the same on the BBC, which is where the trouble arose. The issue of how best to get the first 1000 primes is another matter. Readers may care to challenge O. Ormrod's record.

```
>LIST
    1INPUT"Enter Prime required  ",PN%
    2CLS:T=TIME:DIMP%(PN%):P%(1)=5:N%=1:X%=5:V%=0:GOTO7
    3V%=V%+1:IFX% MOD P%(V%)=0THEN6
    4IF P%(V%)^2 < X% THEN 3
    5N%=N%+1:IFN%<PN%-2 THENP%(N%)=X% ELSE9
    6V%=0:RETURN
    7X%=X%+2:GOSUB3
    8X%=X%+4:GOSUB3:GOTO7
    9PRINT''"TIME";(TIME-T)/100;" secs"
   10PRINT'',N%+2;"th.Prime is ";P%(N%-1)


>RUN
Enter Prime required  ?1000

TIME170.73 secs

      1000th.Prime is 7907
```

cynicism in the public and dealers.

This is understandable. The public's impatience is fuelled by the track record of some external suppliers of BBC equipment. While the official Acorn VIEW wordprocessor ROM has been trumpeted in the press for many weeks the outsider, Wordwise from computer Concepts, was the only one actually readily available in April, 1983. (VIEW, and probably the speech synthesis ROM, are expected to arrive in volume in June). While the production of second processors is still hanging fire (although I am told the 6502 should be out by the time you read this) Torch computers have marketed their Torchpack BBC disk system complete with a 64K Z-80 second processor for several months.

. . . And the good news

The immediate improvements are that the 8-bit second processors are very close to appearance. I have seen one working (the 6502) and met a man who has seen the Z80 going (and I also had a brief opportunity to try the Torch version). In the usual way of things I even met a man whose friend's brother lived next door to the milkman of a man who had seen the 16032 going. To be serious it is clear that the 16/32 bit second processor running successfully, but software reasons will not appe for the best part of a year. When comes it will support BBC BAS as well as other advanc languages. The Z80 secon processor is to be sold in Brita for a noticeably higher price tha the 6502 one, mainly because will come complete with significant software package. Th finalisation of this packa appears to be what is delaying release to some two mont behind the 6502. The 6502 h been demonstrated at seve United Kingdom displays and apparently easy to implement a fast.

While I was in Brit independent suppliers were a assisting in expanding the BB memory expansion by offer paged memory accessed via 1Mhz BUS. The prices quo (almost £300 for a 128K add seemed ridiculously high clearly were cashing in on be first to market. If these prices c such expansions may attractive in the short term bu the longer term memory in 16032 (which starts at 128K can directly access up to Megabytes) looks a better The disk situation looked far rosy. The system uses a chip short supply (and rumou discontinuing production) pundits were forecast shortages in Britain, at least u June.

Maturity of a computer is just measured by memory disk availability, important tho these may be. It is also measu by the depth and quality software and suppor literature. What is happening this area? In general a g software base is appearing remarkable speed. It is very g compared with many mach but naturally pales when alongside the vast library mat available to CP/M and A systems. The former beco available through the Z80 se processor. However, this goes so far in tapping the resources of the BBC syste the sharp end the machine it

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By R. JOE and P. MULLINS, of the Department of Community Health, School of Medicine, University of Auckland.

Apple arrays

As microcomputers become more common in universities, government departments, and secondary schools, so grows the need to communicate useful pieces of software.

A useful data structure for statisticians wishing to perform any sort of data analysis is the array; in particular the structure we have settled on is a two-dimensional array of real numbers, with rows corresponding to cases, and columns corresponding to variables. The computer to which we confine our remarks is the Apple II Plus, a fairly popular model in New Zealand; the programming examples we give will be in Applesoft, the Apple version of BASIC.

The advantages of this data structure are obvious: it is resident in core memory and is, of course, a random-access structure so that information retrieval and modification is fast and convenient. There are, however, problems with storage. Because the Apple treats a disk drive the same way that it would a printer, any numbers are stored as strings of characters, so that the number 3.141593 requires eight bytes of storage. (The machine representation requires only five). This means that a loop such as

```
1000 PRINT CHR$(4); "WRITE OUTFILE"
1010 FOR I = 1 TO M
1020 FOR J = 1 TO N
1030 PRINT A (I, J)
1040 NEXT J
1050 NEXT I
1060 PRINT CHR$(4); "CLOSE OUTFILE"
```

may result in a file which is far larger than it need be.

Another disadvantage of this type of storage is the extreme slowness with which such a file is read back into memory. The reason for this is also apparent; there will be m x n separate INPUT Operations, each of which will involve translating a string into its appropriate numeric representation.

The purpose of this note is to acquaint readers with our solution to these problems:

For all its shortcomings, the Apple disk operating system has one very convenient feature: it is possible to save on disk an exact image of a portion of the Apple's memory. Thus, once the whereabouts of an array is known, it is reasonably easy to save that portion of memory as a "binary file". This, of course, results in a file containing machine representations of the data, which can be a considerable saving in space, and also certainly has the advantage of being very fast, requiring no string translations. On a reasonably large file, the time is typically less than 10 per cent of the time required for an ordinary sequential text file.

The disk operating system of the

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THE TRS-80 in colour

TRS-80 COLOR PROGRAMS
Tom Rugg and Phil Feldman
$39.95. dilithium Press. 332 pages
Reviewed by Mike Heywood

This book is a rewrite for the Color Computer of the authors' earlier book, "TRS-80 Programs" for the monochrome computers, five additional programs bringing the new total to 37.

This book is ideal for beginners in computing or of less value to those transferring from monochrome to colour.

For the beginner the style of writing is very helpful; every program follows a set format.

First, a general program description is given with an outline of possible uses. Next is a sample run. I find this normally missing in most books. It is of great assistance for if you have suspected bugs as at least you are able to see what the program is supposed to do.

Following this is the program listing itself.

Should the program not achieve quite what you desire the next section gives very simple changes that can be made without any understanding of how the program works. For those who want further changes there is an explanation of the main routines and what each section of the program accomplishes. The main variables are listed, and finally each program has a section with a few ideas for major changes for those with more knowledge of BASIC.

The programs themselves are in the main the common type, the perennial Biorythm, Checkbook, Mileage, Arithmetic, Tachist, Graph, Stats, Pi, with others some not so common but nevertheless interesting.

Those programs that are rewrite or translations from the earlier book will be of some value to those making a similar transition from monochrome to colour as they will show the changes necessary to cope with the different screen size and different graphics blocks. That this is a translation is the book's major drawback. It is a very poor comment on the capabilities of the Color Computer as it does not use any of the high definition graphic modes or the advanced BASIC available on that machine. All the programs can be run on level 1 BASIC. But I consider most people would want more.

Not for the beginner

Microcomputer Design and Troubleshooting, by Eugene M. Zumchak (H.W. Sams, 1982). $34.10. Reviewed by Jay D. Mann.

What do you do if you are a book publisher trying to earn an honest dollar in the burgeoning personal computer market? The usual answer to this question is to commission yet another "Introduction to BASIC for left-handed referees". The Blacksburg Continuing Education Series does not fit this pattern. Instead, this series of books comprises a range of technically detailed volumes clearly aimed at the serious hobbyist or instrument technician. The present volume by E.M. Zumchak is a worthy addition to this series.

The book assumes that you want to construct an intelligent controller, rather than a complete personal computer. (In fact, Zumchak discusses the use of commercial personal computers as significant portions of an inexpensive development system.) You know a reasonable amount about digital logic, but you wish to build a system that has a good chance of running right from the start and, even more to the point, one that will continue to keep running despite noisy environments or marginal I.C. chips. The emphasis throughout is on reliability and planning. Designs using either the 6502 or 8085 microprocessors are covered, with much lighter coverage of 6800 and 780 chips except to point out significant differences.

There is extended, well-written discussion of the importance of calculating worst-case timing delays in linking up LSI circuits. Manufacturers' specifications are critically analysed, and found

wanting in some cases. Amusingly, one consequence of timing specifications as given by the manufacturers is that certain microcomputer chips should not be able to consistently write into certain RAMs.

Clock circuits (including clock stretching), interrupts, single-stepping, interfacing fast and slow peripherals, and bus design are all covered at a practical, non-mathematical level. Address decoding schemes (including timing delays, of course) are presented in good detail. An attractive point of the book is that advantages and disadvantages of different approaches are openly considered.

Even if you take the author's advice, and purchase a commercial single-board computer for one-off jobs you will find his extensive discussion of timing and interfacing valuable in linking up that computer with external devices.

The author has several inexpensive ideas for developing software for a stand-alone controller. For instance, using your personal computer (with a suitable interface) you can set up an area of RAM that is read/write to your larger computer at one address space, yet looks like ROM at a different address space to the smaller board. This lets you try out software without constantly burning and erasing EPROMs. (When you are ready to burn an EPROM, though, a $100 EPROM programmer can be constructed.)

Like winning a Golden Kiwi, faultless operation of a new computer system is desirable but not likely. Here a really excellent chapter on hardware testing and troubleshooting will prove very important.

Bug tutorial

"Introduction to T-Bug", by Don and Kurt Inman. Published by dilithium Press. $15.95. Reviewed by Gordon Findlay.

This is ostensibly a tutorial in the use of Tandy's machine language monitor and debugger, T-Bug. This it does very well, by working through the input and correction of several example programs.

The book does not assume the use of an assembler, which limits its usefulness somewhat, as does its emphasis on the nitty-gritty of what is, now, very nearly an obsolete piece of software. This is a pity, as the authors (father and son) are experts at describing the processes they are using, and in showing how to tackle a problem.

The subjects covered are a good introduction to machine code. Loading T-Bug, the various commands available, examining and altering memory, input/output programming, graphics, and program design are covered, for both the level 1 and level 2 machines. Their example are a very good introduction to machine code programming, and the peculiar problems associated with working at a low level.

The book concludes with appendices giving hex-decimal conversions, Z-80 instructions and op-codes, Hex to ASCII, graphic characters and codes, and a video display worksheet.

However, at the price quoted, the book will be of marginal value.

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Direct Video for the ZX81

No matter how much one plays around with adjustments, use of any home computer with a vhf modulator feeding the aerial terminals always gives unsatisfactory results.

The ZX81 lends itself readily to a direct video connection to a monitor or modified TV giving a very acceptable picture. Modifications have been published using a simple connection to the modulators (see fig. 1).

This is NOT recommended, this connection comes almost directly from the Ferranti custom logic chip used in the ZX81. Any low impedance loads (standard video is only 75 ohms), or voltages over 5 volts on this point could prove fatal to your machine!

Also and *very* importantly the use of any TV set as a monitor without an isolated power supply i.e. without a mains transformer is dangerous and illegal. The use of a capacitor to couple the video signal is not adequate. Video contains components down to 50Hz and below. Any capacitor of sufficient size will pass more than enough current to produce a fatal shock under fault conditions. In fact the legal maximum value is only 5,000 pF or 0.005 muF while a suitable video coupling value would be at least 10 muF.

Second-hand TV sets are not expensive and it's a much better idea to buy a suitable model and convert it than to destroy both the computer and its operator.

It is worth noting that the DC level to the modulator input varies greatly with the mode of the ZX81, e.g. between Normal and Graphics modes. This means that a direct connection to the base of the TIS62A transistor is not possible. See Fig. 2.

Fitting this modification, unlike a direct connection does not degrade picture quality on the modulator, in fact it has been used often with both outputs driving different displays.

The 3.5 mm jack socket can be mounted on the rear apron of the ZX81 (top half when dismantled) and the few components required can be mounted on the main PC board near the modulator. The video signal is fed with thin coaxial cable to the socket.

The output is very close to a standard video signal i.e. 1 volt Peak to Peak with 0.2 volts sync and has been used with both commercial monitors and modified TV sets with excellent results.

The circuit has not been tried with the "Spectrum" or other small commercial computers, but a casual inspection of a "Spectrum" board indicates the use of an identical modulator. The bandwidth of the circuit in Fig. 2 is at least 8 to 10 Mhz which is adequate to give a very acceptable composite colour signal.

C.C. Wright
School of Architecture
University of Auckland.

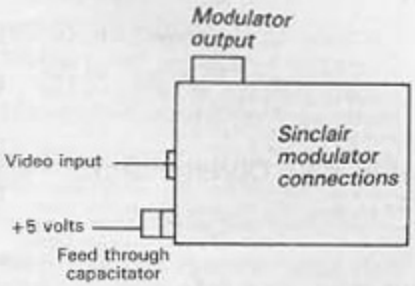

Figure 1

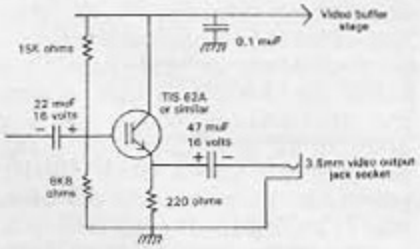

Figure 2

APPLE

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Apple allows the user to save a portion of memory as a binary file. This is achieved by a statement of the form:

B SAVE N, A$ start address , L$ length where N is the name of the file, start address is the address in hexadecimal notation of the first memory entry to be saved, and length is the length in bytes of the memory portion, again in hexadecimal. The problem, then, is reduced to finding these numbers. This problem has been solved, in the form of a published list of all of the machine language subroutines used by the Apple's BASIC interpreter, together with their addresses (1). In particular, there is a description of the subroutine called GETARYPT, which returns the start address of any specified array. (If the array cannot be found, an OUT OF DATA error occurs, which can be trapped in the usual way in an Applesoft program). The length of the array can then easily be calculated from information which the Apple stores as part of the header for the array.

The Apple stores arrays with a header portion describing the array as follows: (numbering the bytes from 1 onward).

(To be continued)

CLASSIFIEDS

For Sale: ZX81, manual, power supply and cassette containing much software. $150. Phone Levin 83-285.

QSAVE device for ZX81-16K; Anyone successfully using one please contact me. 1st unit was returned to UK & replaced but 2nd unit won't work either. Is there a trick? Philip Drummond, 3 Patete Place, WANGANUI.

For Sale: System 80 16K with Thorn 12" B&W TV/Monitor (built in). $1200 ONO. Phone 22-719 New Plymouth.

For Sale: Unexpanded VIC20 City Destroyer. Fast, full colour, sound, Four levels, $12, 8 Freyberg Ave, Stoke, Nelson.

Wanted: Circuit diagrams etc, for ZX81 ad ons. P. Boyce, 287 Tancred St, Ashburton.

For Sale: System 80 Software. Games on 10 cassettes; ring/write 6898/Peace, Box 89, Te Awamutu for details.

For Sale: PET 2001 40K RAM, dual 5¼" drives, software incl. Contact Martin Keast, 75 Villa St, Masterton.

Atari Visicalc, New, 32K Disc, $395.

Space Invaders; Kingdom; Energy Czar by Atari, $49 each (cassettes).

Escape from Volantium; Midway; Games Packs 1 & 2; Alpha Fighter; Star Trek from Dynacomp (cassettes), $25 each.

Send cash/cheque with order: Dr M. Taylor, PO Box 9224, Wellington. Tel 845-099.

For Sale: System 80 microcomputer $550 ono. Star dot matrix printer, 80 column, Centronics parallel interface, interface cable to System 80, and carton of lineflow paper, $700 ono. Prefer to sell microcomputer and printer together $1100 ono. Phone 478-919 Rotorua.

For Sale: Commodore PET 2001. 8K RAM upgrade ROM, business keyboard. With external cassette and software. Offers. Phone 327-807 Christchurch.

Wanted: To buy floppy disk drive to suit System 80. Phone Glen collect, 51-626 Whangarei evenings.

Dr. Dobb's Journal — For Users of Small Computer Systems — A helping hand for the advanced software person. Single copy $6.00. Subscription $60.00 p.a. Computer Store, PO Box 31-261, Milford, Auckland 9.

Computers VIC 20 $765, VIC Printer $860, VIC Disk Drive $1245. Mail order freight included. Write Micromax, PO Box 33-485, Takapuna, Auckland 9.

Wanted: contact with anyone that has converted a teleprinter for use with VIC20. Please write D. Goulden, No 5 RD, Christchurch.

For Sale: Commodore PET 8K with sound and games software. $1000. 6 Forest Park Lane, Gisborne, Ph 5928.

The deadline for classified advertisements is the seventh of the month prior to the month of publication.

CLUB CONTACTS

WHANGAREI COMPUTER GROUP: Tom Allan, 3 Maunu Rd, Whangarei. Phone 83-063 (w). Meets every second Wednesday of the month at Northland Community College.

NZ MICROCOMPUTER CLUB INC. P.O. Box 6210, Auckland. The monthly Meeting is held on the first Wednesday of each month at the VHF Clubrooms, Hazel Ave., Mt Roskill, from 7.30pm. Visitors are also welcome to the computer workshop in the clubrooms, 10am–5pm, on the Saturday following the above meeting.
The following user groups are part of the club. All meetings shown start 7.30pm at the VHF Clubroom.
Other active user groups within the club are:
APPLE, CP/M, DREAM 6800, SMALL BUSINESS, KIM, LNW, SORCERER, 1802 and 2650. They can all be contacted at club meetings or via NZ microcomputer Club, P.O. Box 6210, Auckland.
APPLE USERS' GROUP: Bruce Given, 12 Irirangi Rd., One Tree Hill. Phone 667-720 (h).
ATARI MICROCOMPUTER USERS GROUP: Brian or Dean Yakas. Phone 8363 060 (h). Meetings: Second Tuesday.
BBC USERS' GROUP: Dave Fielder. Phone 770-630 ext 518 (w).
BIG BOARD USER GROUP: Steve Van Veen, Flat 5, 111 Melrose Rd, Mt Roskill, Auckland 4. Phone (09) 659-991 (h).
BUSINESS USERS' GROUP: John Hawthorn, 11 Seaview Rd, Remuera. Phone 542-714 (h), 876-189 (w). Meetings monthly.
COMMODORE USERS' GROUP: Doug Miller, 18 Weldene Ave., Glenfield. Phone 444-9617 (h), 497-081 (w). Meetings: Third Wednesday.
CP/M USERS' GROUP: Kerry Koppert, 2/870 Dominion Rd., Balmoral. Phone 69-5355 (h). Meetings: Micro workshop.
DREAM 6800 USERS: Peter Whelan, 22 Kelston St, New Lynn, Auckland. Phone (09) 875110 (h).
KIM USERS: John Hirst, 1A Northboro Rd, Takapuna. Phone (09) 497-852 (h).
LNW USERS: Ray James. Phone (09) 30-839 (w), 585-587 (h).
SINCLAIR USERS' GROUP: Doug Farmer. Phone 567-589 (h). Meetings: Fourth Wednesday.
SORCERER USERS' GROUP (NZ): Selwyn Arrow. Phone 491-012 (h). Meetings: Micro workshop.
1802 USERS' GROUP: Brian Conquer. Phone 655-984 (h).
The above contacts can usually be found at NZ Microcomputer Club Meetings, or via P.O. Box 6210, Auckland.

Other Auckland-based groups:
ACES (Auckland Computer Education Society): Ray Clarke, 1 Dundas Pl., Henderson. Phone 836-9737 (h).
CMUG (Combined Microcomputer Users' Group): This is an association of Microcomputer Clubs, Groups, etc, formed to co-ordinate activities and to give a combined voice on topics concerning all micro users. Representation from all Clubs and Groups is welcomed to: CMUG C/- P.O. Box 6210, Auckland.
EPSOM HX20 USERS' GROUP. Contact: C.W. Nighy, 14 Domett Avenue, Epsom, Auckland. (Ansaphone, 774-268).
HP41C USERS' GROUP (Auckland): C/- Calculator Centre, P.O. Box 6044, Auckland: Grant Buchanan, 790-328 (w). Meets third Wednesday, 7pm, at Centre Computers, Great South Rd., Epsom.
NZ TRS-80 MICROCOMPUTER CLUB: Olaf Skarsholt, 203A Godley Rd., Titirangi. Phone 817-8698 (h). Meets first Tuesday, VHF Clubrooms, Hazel Ave., Mt Roskill, Auckland.
OSI USERS' GROUP (Ak): Vince Martin-Smith, 44 Murdoch Rd., Grey Lynn, Auckland. Meets third Tuesday, VHF Clubrooms, Hazel Ave., Mt Roskill.
SYMPOOL (NZ SYM USER GROUP): J. Robertson, P.O. Box 580, Manurewa. Phone 266-2188 (h).

A.Z.T.E.C.: Brian Mayo, Church Street, Katikati. Phone 490-326. Members use all micros and the club has just bough: a Wizzard.
TAURANGA SINCLAIR COMPUTER CLUB: C. Ward, Secretary, P.O. Box 6037, Brookfield, Tauranga. Phone: 89-234.
ATARI 400/800 USER CLUB: Dave Brown, P.O. Box 6053, Hamilton. Phone (071) 54-692 (h).
HAMILTON SUPER 80 USERS': Bruce White, (h) 436-878.
GISBORNE MICROPROCESSOR USERS' GROUP: Stuart Mullett-Merrick. P.O. Box 486, Gisborne. Phone 88-828.

NOTE If your club or group s not listed, send the details to Club Contacts, BITS & BYTES, Box 827, Christchurch. The deadline for additions and alterations is the seventh of the month prior to the month of publication.

ELECTRIC APPLE USERS' GROUP: Noel Bridgeman, P.O. Box 3105, Fitzroy, New Plymouth. Phone 80-216
TARANAKI MICRO COMPUTER SOCIETY: P.O. Box 7003, Bell Block, New Plymouth: Mr K. Smith. Phone 8556, Waitara.
HAWKE'S BAY MICROCOMPUTER USERS' GROUP: Bob Brady, Pirimai Pharmacy, Pirimai Plaza, Napier. Phone 439-016.
MOTOROLA USER GROUP: Harry Wiggins, (ZL2BFR), P.O. Box 1718, Palmerston North. Phone (063) 82-527 (h).
MICRO AND PEOPLE IN SOCIETY (MAPS): Levin. meets on second and fourth Thursday of each month. D. Cole, 28 Edinburgh Street, Levin. Phone 83-904, or W. Withell, P.O. Box 405, Levin.
WAIRARAPA MICROCOMPUTER USERS' GROUP: David Carmine. 64 Herbert St., Masterton. Phone 86-175.
CENTRAL DISTRICTS COMPUTERS IN EDUCATION SOCIETY: Rory Butler, 4 John Street, Levin. (069) 84-466 or Margaret Morgan, 18 Standen Street, Karori, Wellington. (04) 767-167.
UPPER HUTT COMPUTER CLUB: Shane Doyle, 18 Holdworth Avenue, Upper Hutt. Phone 278-545. An all-machine club.
BBC USER GROUP: Users of other machines welcome too. Write P.O. Box 1581, Wellington, or Phone 861-213, Wellington.
OSBORNE USER GROUP: Dr Jim Baltaxe, C/- 75 Ghuznee Street, Wellington 1. Phone (04) 728-658.
N.Z. SINCLAIR USERS' GROUP: P.E. McCarroll, 11 Miro Street, Lower Hutt.
NZ SUPER 80 USERS' GROUP: C/- Peanut Computers, 5 Dundee Pl., Chartwell, Wellington 4. Phone 791-172.
OHIO USERS' GROUP, Wellington. Secretary/Treasurer: R.N. Hislop, 65B Awatea Street, Porirua.
ATARI USERS' GROUP, Wellington: Eddie Nickless. Phone 731-024 (w). P.O. Box 16011. Meetings: first Wednesday of month.
WELLINGTON MICROCOMPUTING SOCIETY INC.: P.O. Box 1581, Wellington, or Bill Parkin (h) 725-086. Meetings are held in Wang's Building, 203-209 Willis Street, on the 2nd Tuesday each month at 7.30pm.
NELSON MICROCOMPUTER CLUB: Dr Chris Feltham, Marsden Valley Rd, Nelson. Phone (054) 73-300 (h).
NELSON VIC USERS' GROUP: Peter Archer, P.O. Box 860, Nelson. Phone (054) 79-362 (h).
BLENHEIM COMPUTER CLUB: Club night second Wednesday of month. Ivan Meynell, Secretary, P.O. Box 668. Phone (h) 85-207 or (w) 87-834.
CHRISTCHURCH ATARI USERS GROUP: Contact Edwin Brandt. Phone 228-222 (h), 793-428 (w).
CHRISTCHURCH '80 USERS' GROUP: David Smith, P.O. Box 4118, Christchurch. Phone 63-111 (h).
CHRISTCHURCH PEGASUS USERS' GROUP: Don Smith, 53 Farquhars Rd, Redwood, Christchurch. Phone (03) 526-994 (h), 64-544 (w), ZL3AFP.
CHRISTCHURCH APPLE USERS' GROUP: Paul Neiderer, C/- P.O. Box 1472, Christchurch, Phone 796-100 (w).
OSI USERS' GROUP (CH): Barry Long, 377 Barrington St., Spreydon, Christchurch. Phone 384-560 (h).
CHRISTCHURCH SINCLAIR USERS' GROUP: Mr J. Mitchell, Phone 385-141, P.O. Box 33-098.
CHRISTCHURCH COMMODORE USERS' GROUP: John Kramer, 885-533 and John Sparrow. Phone 896-099.
ASHBURTON COMPUTER SOCIETY: Mr J. Clark, 52 Brucefield Avenue.
SOUTH CANTERBURY COMPUTERS' GROUP: Caters for all machines for ZX81 to IBM34. Geoff McCaughan. Phone Timaru 84-200 or P.O. Box 73.
LEADING EDGE HOME COMPUTER CLUB: Elaine Orr, Leading Edge Computers, P.O. Box 2260, Dunedin. Phone 55-268 (w).
DUNEDIN VIC USERS' GROUP: Terry Shand, 24 Bremner Road, Fairfield. Phone (024) 881-432. Meetings last Thursday of month.
DUNEDIN SORD USERS' GROUP: Terry Shand. Phone (024) 771-295 (w), 881-432 (h).
CENTRAL CITY COMPUTER INTEREST GROUP: Robert Edgeler, Eclipse Radio and Computers, Box 5270, Dunedin. Phone 778-102. Meetings every second Tuesday
NOTE: Clubs would appreciate a stamped, self-addressed envelope with any written inquiry to them.

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spelling and typing errors also give trouble.

This could be the start of something. How should the program develop? One way would be to prompt for the ingredients of a meal, and the amount of each. Once each was found the calorie content per 100 grams can be multiplied by the weight of ingredient to give the number of calories included. As the different ingredients are listed, a running total may be built up, and displayed. Perhaps warning messages — "Think of your hips!" — can be displayed if the total gets too high! There are commercially available programs which do this sort of thing, and also warn of unbalanced diets, and make suggestions for improvements. See what you can come up with — if it's any good, send me a copy; I'd like to see what can become of it.

Atari Correction

G.C. Roberts advises that there is an error in one line of his Maze program for Atari users published in the April issue of BITS & BYTES.

In line 62 "IF MAZE=1 THEN" should be deleted leaving the line to read:

62 IF X<60 AND Y<40 THEN GO TO 27.

The error will not allow the invisible walls to work on the game.

GLOSSARY

Algorithm: A list of instructions for carrying out some process step by step.
Applications program: A program written to carry out a specific job, for example an accounting or word processing program.
Array: A data structure common to most high-level languages. Characterised by each element in the array having a specific index.
BASIC: Beginners' All-purpose Symbolic Instruction Code. The most widely used, and easiest to learn, high level programming language (a language with English-like instructions) for microcomputers.
Binary: The system of counting in 1's and 0's used by all digital computers. The 1's and 0's are represented in the computer by electrical pulses, either on or off.
Bit: Binary digit. Each bit represents a character in a binary number, that is either a 1 or 0. The number 2 equals 10 in binary and is two bits.
Boot: To load the operating system into the computer from a disk or tape. Usually one of the first steps in preparing the computer for use.
Buffer: An area of memory used for temporary storage while transferring data to or from a peripheral such as a printer or a disk drive.
Bug: An error in a program.
Byte: Eight bits. A letter or number is usually represented in a computer by a series of eight bits called a byte and the computer handles these as one unit or "word".
Character: Letters, numbers, symbols and punctuation marks each of which has a specific meaning in programming languages.
Chip: An integrated circuit etched on a tiny piece of silicon. A number of integrated circuits are used in computers.
Computer language: Any group of letters, numbers, symbols and punctuation marks that enable a user to instruct or communicate with a computer. See also Programming languages and Machine language.
Courseware: Name for computer programs used in teaching applications.
CP/M: A disk operating system available for microcomputers using a particular microprocessor (that is the 8080 and Z80 based microcomputers such as the TRS 80 and System 80). See also Disk Operating Systems.
Cursor: A mark on a video that indicates where the next character will be shown, or where a change can next be made.
Data: Any information used by the computer either I/O or internal information. All internal information is represented in binary.
Disk: A flat, circular magnetic surface on which the computer can store and retrieve data and programs. A flexible or floppy disk is a single 8 inch or 5¼ inch disk of flexible plastic enclosed in an envelope. A hard disk is an assembly of several discs of hard plastic material, mounted one above another on the same spindle. The hard disk holds up to hundreds of millions of bytes – while floppy disks typically hold between 140,000 and three million bytes.
Disk drive: The mechanical device which rotates the disk and positions the read/write head so information can be retrieved or sent to the disk by the computer.
Diskette: Another name for a 5¼ inch floppy disk.
Disk operating system: A set of programs that operate and control one or more disk drives. See CP/M for one example. Other examples are TRSDOS (on TRS 80) and DOS 3.3 (for Apples).
DOS: See Disk Operating System.
Dump: Popular term for sending data from a computer to a mass storage device such as disks or tape.
Execute: A command that tells a computer to carry out a user's instructions or program.
File: A continuous collection of characters (or bytes) that the user considers a unit (for example on accounts receivable file), stored on a tape or disk for later use.
Firmware: Programs fixed in a computer's ROM (Read Only Memory); as compared to software, programs held outside the computer.
Hardware: The computer itself and peripheral machines for storing, reading in and printing out information.
High-level language: Any Englishlike language, such as BASIC, that provides easier use for untrained programmers. There are now many such languages and dialects of the same language (for example MicroBASIC, PolyBASIC etc).
Input: Any kind of information that one enters into a computer.
Input device: Any machine that enters information into a computer. Usually done through a typewriter like keyboard.
Interactive: Refers to the "conversation" or communication between a computer and the operator.
Interface: Any hardware/software system that links a microcomputer and any other device.
I/O "Input/output".
K: The number 1024. Commonly refers to 1024 bytes. Main exception is capacity of individual chips, where K means 1024 bits.
KILOBYTE (or K): Represents 1024 bytes. For example 5K is 5120 bytes (5 x 1024).
Machine language: The binary code language that a computer can directly "understand".
Mass storage: A place in which large amounts of information are stored, such as a cassette tape or floppy disk.
Megabyte (or Mb): Represents a million bytes.
Memory: The part of the microcomputer that stores information and instructions. Each piece of information or instruction has a unique location assigned to it within a memory. There is internal memory inside the microcomputer itself, and external memory stored on a peripheral device such as disks or tape.
Memory capacity: Amount of available storage space, in Kbytes.
Menu: List of options within a program that allows the operator to choose which part to interact with (see Interactive). The options are displayed on a screen and the operator chooses one. Menus allow user to easily and quickly set into programs without knowing any technical methods.
Microcomputer: A small computer based on a microprocessor.
Microprocessor: The central processing unit or "intelligent" part of a microcomputer. It is contained on a single chip of silicon and controls all the functions and calculations.
Modem: Modulator-demodulator. An instrument that connects a mircrocomputer to a telephone and allows it to communicate with another computer over the telephone lines.
Network: An intercornected group of computers or terminals linked together for specific communications.
Output: The information a computer displays, prints or transmits after it has processed the input. See input and I/O.
Pascal: A high-level language that may eventually rival BASIC in popularity.
PEEK: A command that examines a specific memory location and gives the operator the value there.
Peripherals: All external input or output devices: printer, terminal, drives etc.
Personal computer: A small computer for one's own use, whether in the home, school or business.
Pixel: Picture element. The point on a screen in graphics.
POKE: A command that inserts a value into a specific memory location.
Printer: Device that prints out information onto paper.
Program: A set or collection of instructions written in a particular programming language that causes a computer to carry out or execute a given operation.
RAM: Random access memory. Any memory into which you "read" or call up data, or "write" or enter information and instructions.
REM statement: A remark statement in BASIC. It serves as a memo to programmers, and plays no part in the running program.
Resolution: A measure of the number of points (pixels) on a computer screen.
ROM: Read only memory. Any memory in which information or instructions have been permanently fixed.
Simulation: Creation of a mathematical model on computers that reflects a realistic system.
Software: Any programs used to operate a computer.
Storage: See Mass storage.
System: A collection of hardware and software where the whole is greater that the sum of the parts.
Tape: Cassette tape used for the storage of information and instructions (not music).
Teletext: An information service which transmits written information in the spaces in the television signal. A teletext decoder is needed to display this information. It is being implemented in N.Z.
Template: A predefined pattern which can be placed over a blank form. The resultant combination can then be used for a given task. For example, Visicalc is regarded as the blank form, a template can be written with the appropriate headings and calculations resulting in a combination which would work like an application program.
VDU: Visual display unit. A device that shows computer output on a television screen.
Word: A group of bits that are processed together by the computer. Most microcomputers use eight or 16 bit words.

BBC

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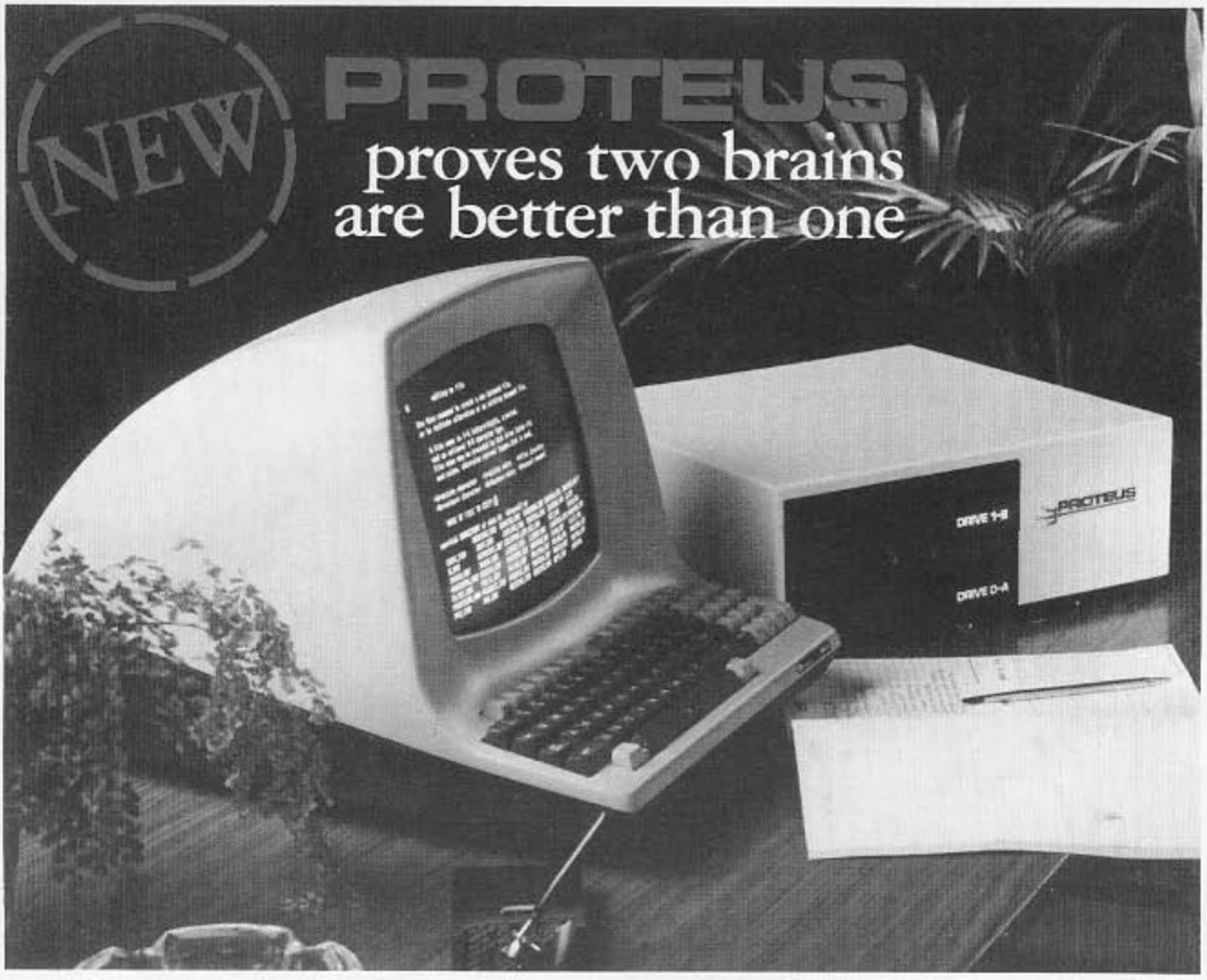
still short on languages. Versions of Lisp and Forth and an initial BASIC compiler are available on cassette already and a ROM based version of BCPL has just been reviewed in the press. The really important options (such as Pascal, a *real* Logo and the interesting possibility of Prolog) are still in the middle distance. This is a cause for some concern to the more demanding user.

As to other developments in software there are some interesting packages emerging, and some interesting books on the Beeb.

In the meantime the preview judgment has to be that the Beeb is moving to maturity through a difficult phase of adolescence. In New Zealand our later involvement means many of the tribulations felt in Britain will be less marked for us.

Write to us



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